Transcript of Proceedings

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THE HONOURABLE JUSTICE C HOLMES, Commissioner

MR JAMES O'SULLIVAN AC, Deputy Commissioner
MR PHILLIP CUMMINS, Deputy Commissioner

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IN THE MATTER OF THE COMMISSIONS OF INQUIRY ACT 1950

COMMISSIONS OF INQUIRY ORDER (No. 1) 2011

QUEENSLAND FLOODS COMMISSION OF INQUIRY

BRISBANE

..DATE 27/05/2011

..DAY 31

THE COMMISSION RESUMED AT 10.03 A.M.

COMMISSIONER: Yes, Mr Callaghan?

MR CALLAGHAN: Madam Commissioner, with your leave, I just seek to make a brief statement before we commence. One term of reference for this Commission commands inquiry into the performance of private insurers in meeting their claims' responsibilities. In response to the invitation issued at the directions hearing on the 10th of February, we have already received many submissions directed towards this term of reference, and I did say, when extending that invitation, that such statements or submissions were to be received by the 4th of April.

However, it may be that some Queenslanders have, since that date, had experiences about which they feel the Commission should hear.

To that end, I can say that if anyone wishes to make or supplement a statement or submission which is relevant to this term of reference, such material will be received by the Commission at any time up to and including the 15th of June. We would encourage anyone who wished to take advantage of this opportunity to refer to the Commission website for further information such as contact details.

I call Peter Baddiley.

PETER BADDILEY, ON AFFIRMATION, EXAMINED:

MR CALLAGHAN: Could you tell the Commission your full name and occupation, please?-- Peter Baddiley. I am the Regional Hydrology Manager for the Bureau of Meteorology.

Mr Baddiley, you have prepared two statements for the purposes of the Commission, is that correct?-- That's correct.

And they contain a number of attachments and exhibits?-- Yes.

Each. Yes, I tender those statements.

COMMISSIONER: Do they have different dates?

MR CALLAGHAN: They do.

COMMISSIONER: Because I would be minded to give them separate exhibit numbers if they can be distinguished.

MS McLEOD: 5th of April and the 11th of May.

COMMISSIONER: Thank you. The 5th of April one will be 496.

ADMITTED AND MARKED "EXHIBIT 496"

COMMISSIONER: And the 11th of May, 497.

ADMITTED AND MARKED "EXHIBIT 497"

MR CALLAGHAN: Mr Baddiley, can we begin with one issue which has been of concern since we began, and that is the role of the bureau, and particularly its role in relation to floods and flash floods? Can we start with the terminology of flash flood? It has an understood meaning in your field, is that right?-- Yes, it does.

And what is that?-- Generally it is defined as a short response time or a short elapse time between the time of the rainfall and the impact at the location that you are considering, and typically those floods which occur within six hours of the rainfall at a particular location are considered to be flash flood.

Now, that's the figure that's referred to in a document which you have exhibited in your second statement as PB2-5, and it is a document titled "Urban Flooding in Queensland - A Review", prepared by Mr David Ingle Smith for the Department of Natural Resources, is that correct?-- That's correct.

You gave some advice for the purposes of preparing this document, is that right?-- We provided some input to that document, yes.

Some input?-- Yes.

As I say, you have exhibited it to your statement, and if we can go to page 6 of that document, that's where you have the definitions and the summary - not you, but that's where the author included some definitions. Now, if I could ask you to move forward to page 53? That's where a number of understandings are recorded about flash flooding. We see in bold type, in the middle of the page there, "The responsibility for flash flooding lies elsewhere in practice with Local Government", is that right?-- It certainly says that, and that does come from the understandings that were in place.

And that's - my next question is where do those understandings come from?-- Well, my knowledge of the understandings come from 1987 there was additional funding provided to the Bureau for - at that time it was called a Flood Warning and Severe

Weather Services upgrade, or something along those lines, for which the bureau was given additional staff and money, including establishing more flood warning in each capital city because it wasn't developed in all capital cities at that time. But my understanding is that that's where the role of the Bureau in flash flooding emanates from about that time, but I guess I was only a young engineer at that point in time. Certainly - and the role was associated with providing assistance in recognition of the very short fuse times or short lead times that we were talking about before.

Mr Davidson in his evidence I think referred to a - his understanding was a Cabinet decision but is this, to your understanding, the same thing that he was talking about, whether it be a Cabinet decision or not it was around about 1987 that some sort of understanding was reached?-- Yeah. I have no knowledge of the Cabinet decision but certainly it was around - around that '86 and '87 time period ahead of the 1987 announcement of a Severe Weather and Flood Warning Services upgrade.

MS McLEOD: I can indicate - forgive me for interrupting - I can indicate there have been some conversations with the Commission in the last few days about this. The Bureau is not in a position to talk about any decisions as such, but we will be providing the Commission with a bundle of material as soon as possible in relation to these arrangements and understandings.

COMMISSIONER: All right, thank you.

MR CALLAGHAN: And I wasn't going to ask Mr Baddiley any more about that on the understanding that that material was coming forward.

Can I just put this definition into context, though? If you go to page 58 that you have got in front of you, "Bureau estimates of flood warning time for a selection of flood prone Queensland LGAs". Is the figure in the right-hand column the figure that would be relevant in determining whether a flood was a flash flood or not? The number of hours recorded there?-- Yeah, it was indicating some typical lead times or warning times. It may not have been specifically the rainfall to flood time but it is referencing what available lead time might have been there, I think.

All right. Just at the bottom of the page, it says, "77 per cent of the total would have less than 12 hours between prediction and arrival of flood." So that prediction might be based on actual rainfall or something else, is that the qualification you-----?-- Yes, that's certainly the qualification, that this is not looking clinically at the delay time in the catchment between the rainfall and the actual response or the impact, but it is looking at what would be the typically available flood warning time for that location. Now, it is related to, if you like, the definition I gave before, of a time of concentration or this lag between rainfall and flood peak. But it is also a number of other

factors come into play, depending on both the catchment, the flood, and the introduction of forecast rainfall.

All right. With that understood, to some extent, at least, that table, or perhaps there is other information that might do it, illustrates that we can see that there will be a grey area or that it is not a sharp dividing line between a flood and a flash flood when we look at the sorts of warning times that are available and the proposition that a high percentage will be less than 12 hours in any event. Would you agree with that?-- Yeah, I would agree with that, and I think that's why the word "typically" less than six hours is used. And you may have a flood in a particular location that is typically longer than that but a particular rainfall circumstance will give it a flash flood. So it is - it is not a black and white.

No. And one consequence - or one aspect of this relates to the accuracy that you can expect in any given warning, and its correlation to the amount of time that's available to give that warning, is that right?-- Accuracy is one consideration. I think - you know, the consideration of these short flood warning times which was evidenced in this 1998 report is sort of looking at the response time that you might have between a warning prediction that the Bureau might give and the response that needs to be taken.

And in exhibit PB2-6, which is the Australian Government Attorney-General's Department Australian Emergency Manual Series - first of all, Manual 21 Flood Warning, can you just tell us what this document is, first of all?-- Yeah, Manual 21 is - I would call it a best practices manual in Australia for flood warning. It has been generated certainly as early as the mid-90s and before that, and it is the coming together under the auspices of - generally under Emergency Management Australia at the time of Commonwealth and State and Local Government officials to look at, you know, how best you might operate flood warning systems in Australia.

And if I take you to page 16, there is what I would suggest is a helpful diagram which reveals the trade-off between warning time and the level of accuracy which can be achieved for a flash flood warning, is that right?-- Yes. Certainly that's an important relationship, that as warning time increases, we see, you know, less accurate, more uncertain predictions.

Which increases the importance of the proximity of the body providing the warning to what's happening, I suppose, is that right?-- Yeah, it does. It sort of gives more weight to those locals that know what's happening and understand what's happening at a local level that need to take some action in a very short time are probably best placed - and certainly in the best practices manuals indicate that that's probably best place to make those decisions.

And if we go back to PB2-5 on page 53 through to 55, in essence the point being made there is that to provide forecasts that have sufficient lead time to lead to useful warnings, the analysis needs to be undertaken locally, is that

the science?-- Yes, the local knowledge becomes increasingly important, and any delay times in the system need to be minimised, because what you are dealing with is very short available times between recognising a threat or a hazard and taking response. So, you know, if you like the best practices of flash flood warning tend to localise the actions with prior advice and support of the Bureau of Meteorology and its severe weather warning services but essentially localising the activity.

And there can't be any argument with the logic behind that, but in practice there are going to be difficulties encountered, because I think if you go to PB2-6 and to page 10 of that document, there is a table which breaks down the system for flood warning and suggests the organisational responsibilities. But the point is that there are four steps: there is the prediction, the interpretation, the dissemination and the response, is that right?-- Yes, that's certainly - this best practice manual looks at breaking down this end-to-end flood warning into those key areas and looks at the roles and responsibilities of agencies in that.

And BOM is clearly responsible for the prediction and the dissemination in Queensland, at least?-- Yes. In some of these manuals you get sort of more acute differentiation between prediction and warning. So although the Bureau issues flood warnings, in some of its best practice documentation, that is further compartmentalised into prediction.

All right. The question will arise, though, in the case of a flash flood as to whether there is ever really going to be time for all of those steps to be taken. There is an obvious difficulty there, isn't there?-- Certainly. I think this table - I am not seeing it in the full context - I think this table is of riverine flooding, not flash flooding specifically, and generally, you know, the interpretation and dissemination and response becomes much more focussed towards local agencies if you were to consider a table similar to that for a flash flooding.

Yes. I wasn't suggesting that it was necessarily applicable; merely that it does illustrate the steps that do have to be taken in any situation?-- Certainly, yes.

And it illustrates that there will be difficulties in a concentrated time-frame in jumping through all those hoops?-- Certainly. And flash flood warning is recognised as a challenging task. I mean, as is flood warning, but certainly as you reduce the time available to respond - I mean, everything becomes time critical and so you have got these very condensed time scales and it is recognised as a challenging task, and it has got the prediction elements, the communication elements, and the social elements of, you know, taking appropriate response.

If we just stick with the communication elements for a moment and what would fall under the heading of dissemination, I would suggest to you that as a general proposition when there

is a major weather event on, people do look to BOM, they check its website and listen for Bureau announcements. That's fairly well understood, I would think, isn't it?-- Yeah, they do.

And so there would be no reason - sorry, is there any reason why, at least, the Bureau wouldn't disseminate flash flood warnings, if we look at it in terms of that table?-- Well, that's currently not our role, if you like, this understanding that we're talking about, that whilst we have a role to prepare and issue severe weather warnings for heavy rainfall conducive to flash flooding, the current understandings of how a flash flood warning system operates doesn't in fact involve the Bureau issuing, you know, hydrologic based flash flood warning for the reasons that we've spoken of, that we're trying to get a very responsive system that's guided by a lot of local knowledge. Ahead of that time, you know, if the Bureau has been consulted, if you like, then we assist in building or advising on how to operate a flash flood warning system for that particular location.

I may as well ask you at this point about the fact that I think on the 10th of January at - I think it was 5 p.m. - I can take you to a document if we need to - the Bureau did in fact use the term "flash flood warning" in respect of the Lockyer Valley. You are aware of that?-- Yeah, it did, and that was an unprecedented action on that afternoon in identifying that there was a - if you like, a catastrophic and severe flash flood in progress. We would turn that - essentially we were outside of practice there issuing an extraordinary flash flood warning. We crafted it from another product and felt that that was what was warranted at that time.

Was it based, though - if we're looking at it in terms of this table - which I accept may not have been crafted for the purposes of flash flooding - but was it based upon predictions or interpretation of BOM, or external information?-- We had - we had the information at that time of not within the catchment but some surrounding rainfall which wasn't particularly high. It was based on recognising what had happened at Helidon. We had at that point - at 5 o'clock we had no other external input apart from seeing the flash floods come up on the TV in the warning centre, the flash floods at Toowoomba, and putting, if you like, two and two together that there was likely to be something extreme happening on the eastern side of the range - not actually knowing for sure that it was occurring but we made a call that it most likely was, and we could at that stage add some value for further downstream. So I think we spoke of, in that extraordinary flash flood warning issued at 5 o'clock, of warnings for people further downstream, like at Gatton and further down the Lockyer Valley.

Just getting back to the point, though, that whilst we understand what you say about the Bureau's role in distributing flash flood warnings, this was, as you say, an extreme case and for that reason you made an exception to the

general rule, is that right?-- Certainly.

Is it only going to be in those extreme cases that the Bureau will play a part in the dissemination of flash flooding warnings or-----?-- I would say that it is probably going to be an unlikely case, that we're playing a direct role in flash flood warning. I mean, the circumstances of that afternoon is that we were dealing with floods, as we know, through a wide part of southern Queensland. We had a lot of staff on deck in the Flood Warning Centre. I mean, many flash floods would occur at night-time with little announcement and no direct involvement of the Bureau of Meteorology's Flood Warning Centre, but being covered by severe weather warnings conducive to flash flooding. So it was certainly a special case, a case of exception, as you call it.

As long as we're talking about that afternoon, you have had an opportunity to read Dr Jordan's report?-- Yes, I have.

And it is the case, isn't it, that the Helidon gauge rose abruptly at 2.30 p.m. on Monday, 10th of January?-- Yes.

And is recorded as failing at 2.53 p.m. because of the abnormally high reading, is that right?-- Yeah. I mean, information comes later to know that the actual recorder heart, if you like, owned by DERM and also with equipment of Seqwater was totally inundated, around that time, around the 3 p.m. time.

I suppose you are partway towards answering my question, perhaps, but who is actually, if anyone, monitoring a gauge like that during an event like this?-- There is no active and direct monitoring of that specific gauge, if you like. I mean, there is something over a thousand river gauges that are included in the flood warning system. There is no specific focus on each and every individual location. Some of them are simply, you know, automatic - I shouldn't say simply, but they are automatic stations for which the data is being received in our various communication inflows into the Bureau's computer systems and published for, if you like, public benefit.

What about the abnormal or the irregular, though; is there a system in place to catch that and draw someone's attention to it at an early stage?-- Not - not for - not specifically an alerting system for a rapid rise. We've got some QC - quality control process emails that come along later and say, "Well, look, there is something abnormal happening at this station", but it is more for, if you like, identifying errors and problems with automatic stations that we need to attend to. So there is no - there is no resource sitting at the Bureau monitoring these, you know, rapid rises or alerts or alarms coming off, you know, the very extensive flood warning network through Queensland.

I mean, I suppose that leads to the broad question and, again, you would be aware of suggestions in the evidence and in the media, I suppose, that more could have done sooner in terms of a warning in respect of the Lockyer Valley. You are aware of these things?-- I am certainly aware of that.

I can take you to them if need be, but I suppose I am inviting your response to those suggestions?-- I think some of those suggestions certainly come from local knowledge, which underpins why you would - why you would base flash flood warning at a local level, that you would need local knowledge to understand the risk. I think sometimes, speaking specifically of Grantham, that I'm not too sure who knew that Lockyer Creek could do such a thing at Grantham, as opposed to the normal, if you like, flash flooding at Grantham where you need to move a car or something like that. So, I think, yes, if you had a full flash flood warning system with alarms, with appropriate monitoring in the catchment with alarms going off, verification at local level, you could do more, but I don't think in the instance of it happening without full knowledge, without a flash flood warning system really in place, that you would be able to do more.

Even in the light of what happened at the Helidon gauge, which is something which might be thought to have tipped you off sooner?-- Yeah, it's subsequently did tip us off, only as a - the prospect, if you like, or the likelihood of something like that occurring, but without any real knowledge that that was occurring, and, in fact, I think even some of the locals had, you know, some disbelief that that was true, that it was occurring, that it was a real - that it was a real occurrence as opposed to a faulty station, which it certainly had all the - I think I wrote in the report or the Bureau's report indicated. Certainly on that afternoon it had all the hallmarks of a faulty station, we were only getting a few reports in for that. Of the - probably of the 160 reports that should have reported, we got about three or four.

There was a fairly severe weather event going on which made it possible that it wasn't just faulty though?-- Oh, certainly, yes, yes.

Well, the concept of local knowledge, local input, is one which keeps recurring in this dialogue. In broad terms, what should local government be doing that they're perhaps not doing or from what could the Bureau benefit by way of additional input from local government?-- It's fairly clear that - and this comes from the best practices guides as well - that to develop flood warning systems that are going to work effectively at the time, you need to understand the flood risk firstly. So - and understanding flood risk comes from either - from experience or from studies, and generally - generally both, I would suggest. So, there's certainly in the - in the hydrological science and engineering world, there's the ability to do quite a lot of modelling to understand flood risk, how - you know, how it will occur and where the water will go and what areas are at risk, and it's - I suppose, that's the first issue. Now, you want to - want me to go

further from there?

Please, yes?-- Then I suppose having understood that risk, then you need to look at the design of a system that would match that risk, if you like. So, you have got decisions about, you know, technically what sort of monitoring system you would put in. You have also got decisions, I suppose, about whether it's such a risk that you want to resource or invest to manage that risk, but on the technical side, you have got flood warning systems, we have assisted other local governments to put in flash flood warning systems that, you know, consist of, you know, relatively high technology systems, they cost money, obviously, they generate alarms based on thresholds of rainfall and water level typically. Those alarms are assessed - and those alarms are at local level, generally assessed that it's not a - you know, a false alarm, but it's a real circumstance, and that gives rise to the ability then of, you know, with the knowledge of what - from the assessment of the risk and some knowledge of what could occur of the ability to put out some warning, although at very short notice and - I mean, this phenomena, flash flooding is - could occur at many locations, so you have got this overlay of, you know, where will it occur and knowledge of where it will occur.

And this is something which you'd say has to happen at a local level?-- Well, it has to happen at a level and at this stage, you know, my understanding is, you know, local governments are charged with, you know, the role of understanding flood, at least in terms of managing their flood plains. So, I suppose it has to happen at some level, but sometimes it happens in a broader catchment level, I would think.

All right. Is there scope if a local government was to go through all of those steps and to get to the point where they were in a position to put out a warning which was based upon scientifically valid data, is there scope for the BOM dissemination network to be used then for a local government to contact BOM and say, "Look, our system tells us that there is a danger of flash flooding at a particular area. Can you broadcast that for us?"?-- There may be scope. I mean, it's something that we would need to explore. Clearly you'd need to be able to resource that. There may be scope for that. Generally the - you know, the best practices manuals are looking for multiple communication methods occurring, not just a single one, so I suppose, yeah, there could be a role for the Bureau in that, but, you know, that would be something you'd need to explore.

You would need a close relationship between the Bureau and the local authority in question?-- I think it probably gets to the heart of, you know, the role of flash flood warning. If you were going to be in the business of providing without some sort of automated process, without some sort of automated system, then there's obviously people needed in that chain, if you like, of putting out additional communications.

On this topic, I was going to ask you about the ALERT system.

I think I asked Mr Davidson about that and he suggested that you were the person to speak to it. Can you tell us about that?-- Yes, I can. ALERT, A-L-E-R-T, is an acronym for Automated Local Evaluation in Real Time, and it had its origins in the '80s in the West Coast of the United States and the Bureau in the '80s looked at that technology for application to not only flash flooding but river flooding in Australia. So, a number of those systems - quite a large number of those systems have been installed in not only in Queensland, but throughout Australia since the '80s. We can step through them and they have an aspect of robustness that - because they're based on VHF radio communications, they have an aspect of very high time limits because they're based on real time event reporting. So, in simple terms, basically it consists of localised - local rainfall and water level gauges that report continuously event reporting in real time, so there's no delays, there's no dependance on telephone, reporting via radio to a computer system which is at the local government, that we provide some software to receive and process and alarm on this data, as well as being transmitted at the same time in real time to the Bureau of Meteorology's Flood Warning Centres, and we're talking very high resolution data, so we're talking reports of every one millimetre of rain for every station or every change of water level, let's say, of five centimetres at a river station. So, it produces a lot of data which needs to be received quickly and analysed by a computing system.

Well, this is something that's been adopted by local councils across the state?-- Yes, it has. We'd have about 25 or 30 of those systems. It's changed a little bit by the way in which local governments have amalgamated, but there's about 670 actual field stations throughout Queensland now. There are predominantly a very large concentration of them from Noosa to the Queensland/New South Wales border, so covering all the populated areas here, out - a system in Warwick, Dalby, in and around Mackay, Bowen area, and then North Queensland, Townsville through the Cairns, and they have basically all been installed since the period of - around about '87 when we're talking about a flood warning upgrade.

Is there any reason, apart from cost, why a council would not install such a system? I will come to the cost issue in a moment, but-----?-- Yeah, look, you need to evaluate whether that's the appropriate system for the - for the particular risk. I mean, first of all you have to identify that there's a risk that you are providing a warning for. You need to evaluate that that is the appropriate technology. Oftentimes it is. There may be - there may be occasions in different areas where you go with a different technology based on telephone or satellite telephone, but - yeah, it's often a solution that has been used in this State.

I will put it another way: are there any areas of Queensland where you're concerned that the relevant technology is not as good as could be?-- I wouldn't use the word "concern", I am certainly aware that the development of flood warning in Queensland is something that's progressive. Like most public

services, it progresses according to, you know, awareness and resourcing and funding. So, there's been a tremendous growth, if you like, in flood warning systems in Queensland, but it's by no means finished or 100 per cent complete in looking at all areas of Queensland.

All right. There is a way in which councils can get funding for systems such as this through the Natural Disaster Resilience Program; is that correct?-- That's one of the current methods for funding. I mean, councils could - local governments could elect to self-fund, but certainly in recent years, most of the funding has been through the - well, the forerunner to the Natural Disaster Resilience Programs and now the NDRP itself, which I think is moving into its third round.

Do you have some involvement in that?-- We have some involvement in providing advice to those local governments considering application, considering, you know, making the application for funding. So, typically we will have had an involvement in developing the proposal, looking at the technical solution that might be applied for, and, as I said before, it may be an ALERT system, it may be a telephone telemetry based system, it may be adding to an existing technology or available system already in place. So, we do have a role in advising in costing, often times in developing cost estimates. So, that's our role in the Natural Disaster Resilience Program at the front end. If it gets approved, we have other roles.

Okay. Just before we leave the question of Toowoomba and the Lockyer Valley for the moment, it's the case that a warning was given by the Regional Forecast Centre for the State Disaster Coordination Centre at approximately 1 p.m. on the 10th of January concerning the severe weather that was about to hit Toowoomba. Mr Davidson referred to that and he was asked as to whether the Flood Warning Centre was aware of that warning. Can you answer that?-- Yeah, I can answer that. I have made some inquiries. Certainly myself, I was on a teleconference call to do with Brisbane and Ipswich flooding through that period. We have examined all of the time logs. There's a lot of communication goes on between meteorologists and hydrologists on a continuous basis. Examining the timelines at - if we get the nearest we can to that 1 p.m., a quarter to 1 there was a discussion with the hydrologist that was free about those storm rainfalls that were occurring. I think they were around about Redbank Creek at that time. We weren't specifically advised that the - a call had made - been made to the State Disaster Coordination Centre, but, look, there's hundreds of phone calls going - you know, in our very busy Warning Centre, so we don't advise each other of every call, but we're certainly aware of and speak directly about the warning coverage that we have for - a la, you know, we and - my hydrologist examined at the time of the meteorologist walking in and talking to him at a quarter to 1 about that rainfall, did it have an impact for us, do we need to switch strategy on any of our Brisbane River warnings because at that stage it was up in the catchment of Brisbane River above

Wivenhoe Dam, was it covered by the severe weather warning. So, there's certainly all of that sort of consideration to know that, okay, we've got this situation covered, this is what we - you know, we were anticipating, this is what we were warning for. So, I think that's, you know, without going into detailed timelines, that's the answer to that.

All right. The answer specifically is that as regards that specific warning, no; is that right?-- As regards the specific phone call to the State Disaster Coordination Centre, no. As regards to the specific warning, the severe weather warning, we were fully aware.

COMMISSIONER: Before you move on from Toowoomba and the Lockyer, can I ask you about the role of amateur Weather Watchers. You would be aware that the Weather Watch blog discussed the prospect of flash flooding in Grantham between about midday and 2 on the 10th?-- Yes.

Although they may have been more focussed on Sandy Creek, but they were also talking about the prospect of flooding further down Lockyer Creek. One of the issues they raise is that they had no means of telling anybody and they didn't seem to think that they could communicate with the Bureau. What do you say about that? Could they have and if they had, would you have taken any notice?-- We get phone calls fairly constantly, you know, in my experience of giving us local information. They could have, I suppose, they could have contacted the Bureau to provide that information. Would we have taken account of it? I think we do look at local information that's given to us. Sometimes it's difficult to verify, sometimes it can be quite a false alarm, sometimes it's on the basis of - I don't know, less accurate or less accurate opinion or even less accurate data that - you know, often had calls of, you know, "This place has had 300 millimetres." On further inquiry it's not over the last hour or even over the last day, it's somebody that's added up over the last three days, but the answer is yes.

Are you aware of the Weather Watch people specifically because they do seem to have a meteorologist on board. I think Mr Cornelius is one?-- No, we have our own storm spotter network. We don't actively - we're not actively monitoring those blogging, amateur or meteorological blogging networks, so that would be something that we - if we were going to actively monitor those, you would need a way of - you know, resourcing that and also-----

I am just thinking more about liaising, whether you have any contact with them at all, whether you think it's worthwhile?-- Not in an operational sense, unless they are storm spotters, volunteer rainfall observers, they lodge - so we have got volunteer rainfall observers that lodge reports directly to us, volunteers in the river height readings lodge reports directly to us, and storm spotters that are able to notify us of storms and there's special communication channels for that.

Who qualifies as a storm spotter?-- Storm spotters

essentially are - volunteer to the Bureau, so that we put out information in the media or by - that we - that we have a storm - you know, volunteer storm spotter and we will accept reports from volunteer storm spotters. It needs to be quite systematic in that we need to know who that person is and they need to know how to report into the Bureau. Some of those amateur bloggers, I don't know, but I think one or two of them may well be storm spotters as well.

All right. But you have never had any contact with the Weather Watch people or Mr Cornelius?-- No. Mr Cornelius has had quite active contact with the Bureau of Meteorology over many years, as far as I'm aware, not with my group, but - at least in the early years, he was a storm spotter himself. I don't know whether he's still a storm spotter, but in the early years he was certainly a storm spotter, he's a very active meteorologist in the area, he certainly has spoken with the Bureau of Meteorology on, I would suggest, on many times. I actually haven't - the have not spoken to Mr Cornelius myself.

If somebody like that had made contact with you, what kind of reception would they have got, would they have been able to get through to somebody who mattered and - say it was Mr Cornelius - and would he have got a hearing?-- He would have got a hearing. We have - we had at that time a severe weather meteorologist absolutely dedicated to the task. They were taking calls about the events that were transpiring. It may have assisted.

Is there any way that communication can be improved for those purposes? It just seems a pity that there were these people thinking very hard about this particular area and looking at their blog fairly rationally, looking at the storm cell and what it might do-----?-- Yep.

-----but somehow they didn't feel able to communicate or didn't know how to do it?-- I think we should - we should look hard at that. I mean, obviously they were benefitting at that time from their local knowledge and they would have been able to provide some valuable input. We'd need to - I mean, we have got official - if you like official volunteer storm spotters that are given special ways of communicating to the Bureau via - I think via internet or via telephones, so dedicated phone calls, not competing with, you know, the general phone load. It's something we could certainly consider, but, again, we - we'd need to look at just, you know, in considering that, how you'd resource that and how you would respond and how you would verify.

You have to work out who's credible, that's half your problem obviously?-- Exactly, yes.

But it's not impossible that you would contemplate dealing with people like that?-- Not impossible, and I think maybe there's a more coordinated approach for the whole of - you know, we're operating very much within a disaster management - you know, with our disaster management colleagues in a

disaster management system and maybe there's a - you know, some sort of central or coordinating focus for that activity of - you know, a growing potential benefit from, if you like, storm spotters or people of creditable opinion being able to - you know, inject their information at the right time. Again, it's an issue of, you know, getting something systemic about that and knowing what is good information and what is not.

If they had contacted you, is there a risk you would have said, "Flash floods not us."?-- No, I don't think that at all. We have certainly - it's not a case of, "Flash floods not us.", it's a case that we have got a fairly clearly defined role in flash flood warning. So, we have got severe weather warning for flash flood, we have - so, we don't actually put out flash flood warnings in terms of, you know, specifically which creek and location, but I certainly don't think that it's not us, it's certainly - we have a service, a severe weather warning, at times it's for thunderstorms but, you know, it can be for flash flooding and if we have local information that can be included in the updates to those warnings.

Well, if you're this group and you've looked at the weather pattern, you have seen the rain cell, you know enough about the topography there to think that the Lockyer Creek is a real risk of flooding of communities further down, who should you contact?-- Well, I think that's a good question. I mean, I think I would be - if it was me, I think I would be trying to contact into either the Bureau or into - probably more likely the local government disaster management area, or directly into, you know, the local disaster management system. I mean, one of the phone numbers that are commonly-----

What if there's no local disaster yet so there isn't a Local Disaster Management Group, this is a disaster about to happen?-- Yes. I think - well, under this occasion, I think most of them were active at that stage. I think probably the point is, yeah, you'd need - you'd need to have a system that was enabled to take those calls, you'd need to be able to resource that system to do that, but I suppose if you were a member of the community and you had these grave concerns, you might well be ringing triple 0, you might well be ringing police, local government, disaster managers, Bureau of Meteorology, wherever you could ring if you had that level of knowledge.

All right. Thanks for that.

MR CALLAGHAN: It was in this context that I was going to take you to Exhibit PB2 at 26, page - 2.6, I'm sorry, 2-6, at page 24 of the manual, and to the concept of informal prediction systems. This isn't just something that might be a good idea as expressed in the manual, it's actually quite important to recognise that such an informal prediction system may exist; is that correct?-- Yes.

And the manual at least seems to positively encourage exploration of the way in which these sorts of things can be

incorporated into the Bureau's information?-- Well, into the total warning system. Whether that's into the Bureau's-----

Or into the total warning-----?-- Into the total warning system, so that if you capture all available information and if there is - I mean, one of the - you know, in terms of developing flood warning systems over the years, it's to try and capture the local benefit where that's identified and, you know, quite a number of local areas have these informal prediction systems, but, you know, whilst they're informal, they're still very valuable.

And I suppose the one question arising out of the Weather Watch concerns is is there actually a phone number that someone in possession of relevant information could have designated for them to get information directly to those who would be able to act upon it; in other words, something other than the general landline?-- Not for - not for general - not for general public, for designated official storm spotters-----

Yes?-- -----those that are - that are in the Bureau's volunteer rainfall program or in the Bureau's volunteer river height program, yes, there's ways of reporting information that can be handled quite systematically.

And how does someone get on that list of people who would have access to that number? The people you have identified are obviously people who are doing specific tasks-----?-- Yes.

-----for the Bureau, but is it open for someone to say that - make a submission to you requesting that they should have access to that number?-- Well, generally those numbers have been provided to those that are giving us, you know, specific tasks, like storm spotters-----

That's right?-- -----or measuring rainfall and so on. I don't think we would open that - if you're asking me would we open up that telephone number for anybody that wants to ring in and give their opinion about what may or may not happen, no, that wouldn't be the case.

No, if they made a case to you though?-- Yes. Oh, yes.

Would you entertain it?-- Yes. If they are wanting to become a storm spotter, certainly, yes, that's - we would give them the necessary paperwork and list them as a storm spotter. For volunteer rainfall readers that read rain gauges on a daily basis - and this is getting a bit away from flash flood - but we'd give consideration as to whether there was gaps in the network or whether that additional information was needed. I mean, we don't need - necessarily need two side by side, for example, we might be able to say to that person, "Look, you know, there's already rainfall measurement from there." In respect of reading river gauges, there's a little bit more involved where generally when we have people coming to us to say, "Look, I think there should be a river gauge here for which I'm prepared to read.", then generally our response is

to say, "Well, look, could you work through your local government to - for them to reaffirm to us that it's needed, that they would value that information.", and then we would need to look at a way of funding the equipment, because obviously they're more expensive than, say, a volunteer storm spotter that's supplied with a bit of advisory material as to how the report the look of a storm.

COMMISSIONER: These people are not really storm spotters, though, they are enthusiasts who analyse what they can see of weather events. It may be that you don't think they are sufficiently reliable to want their information on a regular basis, perhaps your impression is perhaps they got lucky with this one and it is a flash in the pan, but you don't seem to be embracing the idea, at any rate, of welcoming the involvement of a group like this in any way?-- No, quite the contrary. I think we should consider it. There is definitely this growing band of experts - you know, storm chasers and - that are really committed - that are really committed to this. Whether it is something the Bureau has got to look at, you know, of capturing this knowledge, whether the knowledge needs to be captured into the Bureau and whether we could even handle the demand that that might be across Queensland for people that are experts that want to inject their expertise, if you like, or whether we should be looking at localising that to say, "Look, really, the best people to evaluate what you're saying is a possibility or a risk is those at local level and then they have - they already have - that brings them into the disaster management system, so they already can make a decision about whether that's good information, make a decision as to whether that should go out to the Bureau, should it go back up to disaster managers for some - but I certainly don't discount it. I think it is something that in this day and age we need to look at.

All right, thank you?-- It is just really I am thinking how to do it.

MR CALLAGHAN: What you say is consistent with the philosophy at least expressed at page 24 of the exhibit?-- Yeah, and I might add - I mean, I think - you know, I was listening to the hearings in Emerald. It is very much that we're capturing informal and local expertise provided it has been thought about in a sense beforehand. It is very hard to capture this information ad hoc from people you just don't know, you don't know - in a sense Bureau of Meteorology doesn't know a lot of the local detail they are talking about, and that's why I am thinking - I am really thinking that maybe some of that information needs to be - it is not meteorological, it is sort of "here is a local interpretation of what I think will happen", and I am thinking that, you know, maybe that would need to go to a local level for verification, but that's the style of thinking I have got at the moment, anyway.

Can I ask you some questions about the flood warning service, and there is an overview of that service in the Bureau's report between paragraphs 32 and 37, and in your second statement, I think, at paragraphs 50 and 51? Mr Davidson was asked about any improvements that might be made to the flood warning service, the possibility of a denser network of river height gauges and more rainfall supporting stations was canvassed. Would you agree with those as suggestions for improvements?-- Yes, continuing to invest in monitoring, certainly, you know, underscores the ability to provide flood warning.

And specifically, for example, in Brisbane, there seems, for the layperson at least, to be a significant distance between the gauges at Jindalee and the gauge in the city. Would an increase in the number of gauges in that and other reaches of the Brisbane River assist in providing more accurate predictions?-- I think I can maybe address that in two ways. I don't think it would assist in providing more accurate predictions. These predictions are made, you know, sort of 24 hours ahead, 12, 24, maybe up to 36 hours at the best for those locations of Moggill, Jindalee and Brisbane. With the degree of modelling that's available to hydrologists and to councils, there is certainly - those stations are enough to define, you know, the flood levels and inundation between those locations. I have wondered to myself that maybe there is value in having more gauges, such that they become more like neighbourhood gauges where they are sort of a recognition that they apply to a particular neighbourhood, that you don't live so far away from Jindalee that you don't think it is something that you should think about, and so maybe, you know, more neighbourhood gauges, particularly where you have got that complex flood level interaction in the Ipswich area, there may be value in putting in more of these neighbourhood gauges that people relate to, that build their awareness, and that's - but I don't think it is needed from a technical viewpoint.

What you suggest has a common sense appeal. Would that be a Bureau responsibility or a Local Government responsibility, or something you would work together with Local Government to achieve?-- I think it is something that we would work together with - I think it would certainly be a Local Government decision as to, you know, how many river gauges you wanted and where you would want to place them. That's certainly their decision. What the Bureau's role would be to integrate them into the Bureau system. So, you know, we have got very well developed communication systems to enable that data, those readings to come through into the official system, if you like, and within, you know, a very short space of time be lodged on to computers, be made available at websites, and so on. So I think, really, that's where the Bureau of Meteorology role comes, and I think it is a natural progression more of seeing, you know, the need for more river gauges throughout the State.

Can I ask you another question which Mr Davidson referred to you and that was about the run-off models and the manner in which they work and how they are taken into account in the flood modelling undertaken by yourself. Can you give us a brief statement as to the effect of them?-- Well, the Bureau has in its Flood Warning Centre, the hydrologists have developed flood warning models, or flood forecasting models for most river systems in Queensland. I think we're dealing with about 47 river basins and 150 models, and variously, you know, according to where you want to speak about, they look at taking all the inputs of rainfall and water level and enable the hydrologist to interact with them to make predictions of downstream river heights. They will - they vary in

complexity, they vary in ability to make predictions based on, you know, limitations of, you know, the monitoring network, they vary in how far you can look ahead, according to what we spoke about earlier, you know, about some catchments respond very, very quickly to rainfall. Others, as we know, may take days.

And does the modelling incorporate all of those variations?-- Yes, it does. I mean, I have seen quite a bit of conversation about Brisbane model, for example, is one of the more complex models that we operate and it has, as we know, input from Wivenhoe Dam in terms of dam releases, it has modelling of each of the major tributaries of - and I am using each of these as an example - each of the major tributaries of Lockyer and Bremer. It looks at the local contributions of heavy rainfall over the middle reaches of Brisbane, for example. It looks at the interaction between Brisbane and Ipswich, between the Bremer River and Brisbane River, and the timing of those flows, their interaction in terms of how they affect the heights. As we come further down the river it takes account of the astronomical tide at, say, Brisbane City gauge. So we look at - so we have got in our models the ability to model the interaction of tide and arrival of or predicted flow. And if we go right to the bay, Moreton Bay, we can impose or model or include the effect of elevated sea level, which was a factor early on in last year - late last year. If the sea level is elevated or, in fact, if we, you know, have got a cyclone arriving which is going to cause a storm tide. So there is a lot of factors, if you like, taken in the more complex models but simpler models do exist.

All right. Well, let's stick with the Brisbane model because I was going to ask you about the concept of projected releases from Wivenhoe Dam and the use that's made of those in the predictions made by the Bureau. There is a specific example referable to the 11th of January and that which occurred on that date. As a starting point, though, your modelling is done on the basis of the Flood Operations Centre's advice about what the release strategies are going to be, is that right?-- Oh, yeah, correct. So we get an actual - the actual releases plus the projected releases ahead in time.

All right. Well, what, you get the actual releases up until that point-----?-- Up until now and then a projection beyond that time.

And your predictions obviously have to be based upon the projection which is said to be the worst case scenario, is that right?-- No, our prediction is based on the-----

Sorry, the releases. You get a projected worst case release?-- I don't think it is - I wouldn't say it is a projected worst case release; it is their actual release strategy at that time.

Yes. Isn't that how it is described, though? I might show you a collection of documents. Or at least there is an email at 1.32 p.m. on the 11th of January?-- Yes.

The subject is "Actual and projected Wivenhoe releases - note that this is our worst case for the next 12 hours." And it is actual up until the time-----?-- Yep.

-----2 p.m. on the 11th and from then on it is projected. So I would interpret that as saying that's the upper limit of the projected releases - projected upper limit of releases. Is that the way you would interpret worst case?-- It is the way I would interpret it. I think - I don't know why that comment's been added. I wouldn't have expected to see that comment there, and, in fact, that particular scenario had a peak I think of about 6,675 CUMECS in that particular scenario, which is the critical one for which we had to do, you know, the modelling for projection of Ipswich and Brisbane flood heights.

All right?-- However, I don't know why the term "worst case" is issued there, because at that time at 1.30 p.m. it was still raining very heavily and the next one that arrived and in fact took flood peak up higher. So I think you would have to ask the dam operators why they were thinking-----

Well, we probably don't-----?-- -----or what was meaning by that this is a worst case.

We probably don't need to bog down on that because I think, to be fair, it is perhaps not a term that's commonly used in communications of this kind. That might be the only occasion on which it occurred. But in any event, that projection is the basis upon which your modelling is done at that time?-- Oh, yes.

And you are aware that, in fact, the actual releases which were being made at, say, 3 p.m. on the 11th were different from the projection? I might show you a document which just summarises this. You are not expected to have the figures committed to memory. I emphasise this is a Commission document. It is prepared as a summary. If there is a mistake in it it is all ours?-- Yep.

But there is a comparison there which I would ask you to accept-----?-- Yep.

-----for the purposes of this exercise-----?-- Yep.

-----which shows that the actual releases which were made were different - and the differences are recorded there - from the projected releases upon which your modelling would have been done?-- Yep.

Do you agree with that?-- Yes, I can see that.

And the difference in the first case at 3 p.m. is one of over 600 CUMECS?-- Yep.

We have a sense that a difference of 500 CUMECS can have a significant effect, depending upon where the river is at and

where you are looking at it?-- Yep.

The question is simply this: you were doing, I think, some modelling at 2.55 p.m. There was obviously a lot of modelling done that day?-- Yes.

And we know from your statement, I think, that you were doing some modelling at 2.55. At that time we can tell that the actual release was very different from the projected release upon which your modelling would have been done?-- Yes.

The question is simply this - and I am not interested in knowing what difference it would have made necessarily, or what river level you might have predicted at the time - but the question is simply this: would such information be useful to you at the time you were actually doing the modelling at 3 p.m.? Would it have been useful for you to know that the actual release was different from the projected release?-- Only marginally. I mean, at that time, what we were actually modelling and making our downstream predictions - our predicted levels, if you like, for Moggill, Jindalee, Ipswich and Brisbane is based on the scenario going through to 6,600 CUMECS that night. The way in which it gets to that makes some subtle variation in the speed and the rates of rise that occur, and there obviously - if I take this as, you know, as what was occurring at the time, the releases are slightly quicker than the strategy that we have been given. But it is not going to change the ultimate prediction that we made at that time, which, if I can recall, was, you know, the possibility of 22 metres at Ipswich and greater than 74 at Brisbane, which we're looking some 24, 36 hours ahead. So this is quite subtle refinement that you would be making about, you know, how the rates of rise that you would experience downstream, and, of course, yeah, it is becoming somewhat significant, you know, a 500 or 1,000 CUMECS, but in the scheme of the uncertainties that we're dealing with, the uncertainties of Lockyer Creek flows, the uncertainties of Bremer River flows, the projections we're making of what this rain is doing and what impact it will have, I suspect that this is really in sort of real fine tuning territory, apart from, perhaps, if you were making predictions immediately downstream of the dam. So you might need to take account of these if you are making projections and you were concerned about projections immediately in that Fernvale/Lowood area, for example, you would probably want to be seeing that. We don't actually get all of those dam releases or actual releases, you know, hour-by-hour description of them - and we were getting updated every two or three hours, let's say - and, of course, that's also the sort of latency in our modelling, is that, you know, we're not modelling every 15 minutes and fine tuning, you know, with all of the uncertainties that are involved, necessarily going to get value out of fine tuning every 15 minutes. We're doing a run approximately about every couple of hours.

That's why I drew your attention to this example because you were doing some modelling at about 3 p.m.-----?-- Yes.

-----and there was that discrepancy then?-- Yep.

All I am asking is whether it wouldn't be helpful, when you were doing that sort of modelling, to have the best information possible?-- At that stage I don't - we wouldn't be able to go back and insert those actual values there. The Brisbane River model at that time was taking probably of the order of 20 minutes or so to run, and of the order of 40 minutes really to analyse and so on. I don't think we would go back - unless we had a specific need to really refine a prediction immediately downstream of the dam to take account of a 500 CUMECS change, and somebody was using that product for that area, then I don't think it would be something that we would find that we would, you know, immediately adapt. It is not to say in the future, I suppose, as we get quicker models, more - maybe set them running in an automatic way with this automatically ingested, that you wouldn't use that information.

What if, for example, you had been doing some modelling at 4 p.m. and the difference there is a bit more pronounced, perhaps 1,200 CUMECS? Is that starting to get significant, or it still falls under the qualification that it is the uppermost figure that counts and it doesn't really matter?-- Yeah, we have made the forecasts on the uppermost figure. It is - it is, if you like, suggesting that things are going to - downstream is going to rise slightly quicker than what our models would be currently saying, but I am sort of suggesting to you that - and the CUMECS is getting important, but in terms of the predictions that we're making that Ipswich - let's say Ipswich or Moggill will go from here to 22 metres, refining how that will do it in the next few hours or, you know, in 12 - I mean, effectively this 1,200 CUMEC difference makes an immediate difference, say, six hours' difference for Lowood, but it doesn't come into play until 12 and 15 hours down at Ipswich. So by then - so you are saying at 4 p.m., shortly after that at 4.51 p.m. we have got a whole new update that includes all of these - their actual releases up until 4.51 p.m. I think what it gets down to is how quickly can we, you know, change things, rerun models, you know, can we run on a 15 minute updating cycle and with that provide lots of value. I suspect not.

That's essentially my question?-- I suspect not.

All right?-- Something we might do in the future.

As models get more sophisticated?-- As models get more sophisticated, as automation increases. Certainly not discounted. In terms of, though, providing a forecast for Brisbane, Ipswich - I mean, we were really pushing it to give out 24 to 36 hour for the city. That's taking a lot of uncertainty into account and, you know, as we know, they were slight overpredictions. They were overpredictions.

Can I just pick you up on something you said a moment ago. In effect, I think you said 20 minutes to run and 40 minutes to analyse, or something like that. Is that what you said?-- Of

that order, depending on the complexity of the model. So I think in that particular time-frame, very, very marked change. We were pretty actively modelling. We have got that new scenario at 1.30. We were very actively modelling between 1.30 and about 10 to 3 we - around about 10 to 3, 5 to 3 we really finalised on the scenario that we would run with and the predictions that we would give in that warning that was eventually issued at 3.24. Other models can happen far quicker than that. This was one of the more complex jobs that we had on our plate on that day.

COMMISSIONER: Mr Callaghan, do you think Mr Baddiley will be finished by lunchtime? If he will, then we might press on. If not, we-----

MR CALLAGHAN: We might have to ask my colleagues that. I have probably got about another 15 minutes.

COMMISSIONER: I think your chances are fairly good then, if you want to keep going.

MR CALLAGHAN: All right.

COMMISSIONER: No pressure on anyone.

MR CALLAGHAN: You mentioned that you were doing some work at about 1.30, I think. We know, by reference to your statement at paragraph 129(d), that by about 1.40 p.m., or perhaps at the latest 2 p.m., that we were looking at something that approximated, at least, the 1974 level, is that right?-- Yes.

It wasn't until 3.25, I think, that the actual warning went out using the term "1974". You may say it is only two hours, but once that figure - once that concept of 1974 was alive, shouldn't that have been the subject of a warning straight away?-- As I say, there was a lot of modelling work, a lot of uncertainty in arriving at such a critical forecast for Brisbane at that time. So I think that 129(d) is showing some of that around about 2.15 p.m. we are dealing with thinking about as high as '74. At that time, though, at 2.15 p.m., we have got extremely heavy rainfall continuing. So we have got a very rapidly changing circumstance and we've got one shot at this, in a sense. We spent a bit more time, if you like, after that 2.15 p.m. to really take account of the - really look hard at some of the uncertainties, to really look hard at some of the forecast - the observed and forecast rain that was continuing at that time, to not only use the rainfall run-off model but to bring out some verification techniques that we have about - to verify, based on past floods, the likely outcome, such that in the next, you know, half an hour we're really taking into account all of that, we're back to looking at potentially if this situation continues as it looks like it was continuing at that time of being higher than '74, and you can see that we're arriving at that at around about 10 to three-----

Yeah, but at - between 1.40 and 2.15 it was agreed that the wording in the next warning should be "as high as" - and I

appreciate that the later warnings refer to higher - but the concept of 1974 was invoked at at least that time. That's what I am suggesting to you?-- Yep.

And-----

MS McLEOD: Can I just correct something here? In fact, 1974 is referred to at 9.28 a.m. on that day with a reference to the Lockyer Creek falling .3 metres below that level. So in terms of the reference to the concept of 1974, it had appeared earlier than that 3.24 warning.

MR CALLAGHAN: All right.

COMMISSIONER: Thank you.

MR CALLAGHAN: Well, in any case, you specifically at 1.40 p.m. had settled on the wording to be intended to be used in the next flood warning?-- No, that's not at 1.40 p.m.

2.15?-- That's about 2.15 p.m. because we'd only just got the - as you have put that email in front of me before, we'd only got the new strategy at 1.32 p.m. So up until that time, we were operating on about a 4,000 CUMEC peak release from Wivenhoe Dam. At 1.32 p.m., all bets are off. We have got to go back to completely remodelling the Brisbane River. So that initial conversation at 1.40 was to say, "Look, we've just started another round of modelling with a whole new release strategy", which at that stage now has gone, because of the really high rainfalls, has now gone from 4,000 to almost 6,700 CUMECS. So around - so you can see there at about the half hour of modelling, we're getting to some - forming some opinions at 2.15 p.m. that based on what we've got now, based on the 1.32 release and what's occurring, we're forming an opinion at 2.15 p.m. that this is starting to look more like a '74 flood. From between 2.15 p.m., that next half hour, if you like, we were still doing intensive modelling, if you like, and verification of what we were coming up with, and, I suppose, really, my - I think you will find that we really hadn't gone through the whole process that then is required of us to agree on these predictions or at least notify these predictions until just before 5 to 3.

The warning then goes at 3.25?-- Yeah, the warning then goes at 3.24. So at that stage I have finished the negotiations or the advising of Brisbane City Council. I go on to a telephone call with the State Disaster Management Group and my senior hydrologist writes the warning and gets it out by 3.24.

All right. Changing subject, are you aware of the suggestion that the flood operations engineers should be provided with ensemble forecasts by the Bureau?-- Oh, yes, I am.

What's the Bureau's current practice in respect of the provision and use of ensemble forecasts?-- Current practice is we're providing them, as they have reported, with a Quantitative Precipitation Forecast, a QPF, which is not of the ensemble form, it is provided twice a day, it is a range

of possible forecast rainfalls for the next 24 hours. So currently we don't have an ensemble forecast, as such, except when you look at, as has been termed, the WATL, water and the land, forecast rainfall website, also called the poor man's ensemble. So it is - whilst it is just presented graphically, it is an ensemble of a set of models.

What's it used for at the moment?-- It's provided on our public website in a - well, it's a quantitative form, but it's just presented in a graphical format on our public website.

All right. Can we question get Exhibit 408 on the screen, please? Have you seen that document?-- I have seen the document. I have read it very briefly.

Okay. Have you read it to the extent that you can comment not on the actual responses, but upon the questions that are raised within it?-- I have read it - it is very comprehensive - and noted the areas in which the Bureau may be invited to participate.

All right. Did you have any suggestions that should be included on it, not in response to it, but as-----?-- As additionals?

Yes?-- No, I thought this was quite comprehensive, but I haven't spent - you know, a long time deliberating over this document.

All right. Thank you.

COMMISSIONER: If you should do so, feel free to let us know any additional views you have?-- Thank you.

MR CALLAGHAN: Can I show you another document? Sorry, I should tender the summary of discrepancy between projected and actual releases.

COMMISSIONER: Exhibit 498.

ADMITTED AND MARKED "EXHIBIT 498"

MR CALLAGHAN: And the document you have got in front of you now is relevant to the reliability of seasonal forecasts. Oh, you don't have it yet, sorry. Now, I realise you didn't prepare this, but you understand it shows the reliability data for seasonal forecasts between 2000 and 2011?-- Yes. Well, I can read - I have seen this document once only very briefly. I can read that it is between 2000 and 2011. It's looking at the reliability of our seasonal climate outlook statistical model. So, yes.

And in assessing the reliability of the model, where there is forecast, say, at 75 per cent chance of medium rainfall and there is, in fact, an above medium rainfall of 75 per cent of the time, that would be a reliable model; you'd agree with that?-- It's indicating statistical reliability for the objective of the seasonal climate outlook model which is predicted, you know, above or below median rainfall for a whole three month period, yes.

The reliability is reflected by the proximity of the dots on that graph to the diagonal line?-- Yes, they are, and-----

Overall, it would suggest that the Bureau's seasonal climate outlook model is reliable?-- Yeah. Look, I didn't prepare this diagram. I mean - but I also note that at the - you know, around the forecast probabilities of .2 at the low end and .8 at the high end, there is movement away from the reliability line, if you like, and I'm certainly not the expert to know why that is, but there's - there is less reliability when you get away from the forecast probabilities of, you know, the central forecast probabilities.

Yes, but overall it tends to suggest it's reasonably reliable; you accept that-----?-- Yes.

-----overall proposition?-- Well, in the area of - you know, about forecast probabilities of about .3 through to about .8, yes, and then there's deviations.

All right. I tender that.

MR O'DONNELL: Commissioner, I would object to it. The document hasn't been vouched by this man. He doesn't say it's his document. We don't know what from what information it's been prepared, who prepared it, what it's intended to show. All he said is he's seen it once only briefly.

COMMISSIONER: All right. So he may not be authoritative on it, but can you give its origins?

MR CALLAGHAN: We might address that separately.

COMMISSIONER: All right.

MR CALLAGHAN: If there's an objection now, we can substantiate it elsewhere.

I asked Mr Davidson a question about the protocol for communication of flooding information, which is referred to, I think, in the Bureau's report at paragraph 57. That was one that he suggested that you might speak to, rather than him. What can you tell us about that protocol?-- Is this going to come up on my screen? So, this is the protocol that was developed following the October Brisbane flooding? Yes. What can I tell you about it? I was - I participated in the meetings that were held between October and December for the development of this protocol. It is a protocol between State and local government. The Bureau is not a signatory but we have provided input.

Just finally, I might ask you are you aware of any initiatives which were undertaken after the 1974 floods, initiatives relevant to flood warnings, flood mitigation or anything that might be of interest to us, any initiatives that were undertaken then and whether they were completed and whether benefit was derived from them?-- Because I wasn't - I wasn't a hydrologist in 1974, I was here in the flood, but what I am

aware of is that after '74 there was intensive technical evaluation of the floods, there was a series of conferences held, there was a number of studies undertaken, there was production of - I think they're tomed the 1975 or 1976 Cities Commissions - Cities Commission Flood Mapping, which is about 18 or 20 very large scale sheets. They were developed at that time. At that time also I think there was, you know, looking at response, there was a volunteer engineer system developed which didn't obviously - wasn't sustained for 30 years. Obviously I don't know when that stop.

A volunteer engineer system?-- Yeah, there was a set of - from my recollection, there was engineers, volunteering to participate and lend their expertise in suburbs of Brisbane should another flood occur. Of course, it took a long time for another flood to occur and that doesn't exist today. In fact-----

Would such a system - what would such a system have achieved?-- I think it was addressing the interpretation issue of having - well, in those days, I suppose, you know, some trained or skilled engineers interpreting where the floods might go and so on, but it actually came from the professional body. I think it was instituted from the then Institute of Engineers Australia, sort of, "Gee, how can we help Brisbanites?", and there was a volunteer engineer system set up. I suspect that certainly when I came on the scene, around about 1980, I think - I don't think it was in force then. Certainly the maps, the maps exist and obviously the - all the studies that were undertaken, you know, we'd built upon them since that time. It initiated obviously the Wivenhoe Dam work, but the - those flood maps still exist.

I have nothing further.

COMMISSIONER: Mr Dunning?

MR PORTER: I am dealing with this matter, Commissioner. Just one question on behalf of the council - I appear for the Brisbane City Council, Mr Baddiley. You were discussing with Council Assisting the prospect of neighbourhood gauges or more gauges being put into the river between Jindalee and the river mouth, and I think you indicated that that wouldn't assist in providing more accurate predictions of flood levels, but just moving on from that report, for the Brisbane River model, when you are running the Brisbane River model and making flood predictions, would it be possible, if there were additional gauges in the river, for the Brisbane River model to provide flood level predicted - predicted flood levels at those additional gauges?-- Yeah, it would be possible. I think the way in which you would use those, though, is that the council, Brisbane City Council, runs the more detailed modelling, if you like, looking at the subtle variations that occur between Moggill and the City gauge and right to the Bay.

Yes?-- So, I think really it would still - my first thinking

on that would be that we would probably still be involved with forecasting for the key gauges.

Yes?-- And council, in effect, does this now, where, as you know, they use their profile Bender to get all the subtle forecast heights all way down the river, and I suspect if there was infilling of that information, public information going out about that, that might well be a council detailed information at the council detailed information level.

So, is it your view that the sort of interpolation that's done with Bender and similar kinds of models is likely to be just as effective in identifying the differing levels down the river's path as identifying further levels using the Brisbane River flood model from BOM?-- Yeah, I said, yeah, those - those gauges, I don't think, would add technical value. I was thinking out aloud they may well add some social value because what we saw in this flood was that people distant from Moggill or from Jindalee or City didn't realise that there's a significant flood slope along the river, that if you live somewhere between Brisbane and Jindalee it was going to rise much more than what Brisbane was going to rise, and I was thinking more or less out aloud that maybe - maybe neighbourhood gauges would help, although - you know, there is other ways of looking at that - providing interpretive and detailed information at the householder level.

I take it, though, that it would be possible for the Bureau's Brisbane River model to produce more levels and additional gauges to predict more levels-----?-- Yes, yes.

I don't think it should be much better than that which the Brisbane City Council can already do?-- Yes, it would be possible.

Nothing further.

COMMISSIONER: Ms Brien?

MS BRIEN: Mr Baddiley, I appear for Ipswich City Council. Mr Baddiley, do you agree there are three methods of communication of information used by the Bureau? One is by the website, one is by way of e-mail, and one is by way of telephone communications. There may well be others, but if we can just-----?-- Oh, yes - yes.

Information provided from the website, it has a benefit that reaches the widest audience; would that be correct?-- It has that benefit, but it doesn't have as much detail as may be in an e-mail. I think if we're talking about - in an e-mail, although I am not too sure what we are referring to as e-mail, but certainly, yes, it has a wider - a wider access, but less information than what would come through a telephone conversation.

Certainly.

COMMISSIONER: Ms Brien, just before you go on, can you get any closer to the microphone, do you think? Either that or bellow?

MS BRIEN: Is that better? Information provided by way of e-mail - considering these three options of communication - in your view is that the next best option as it's written, it can be broadcast to a number of people at the same time?-- I am wondering - I think the e-mail - I think what you are referring to as e-mail is the provision of our flood warning via e-mail or is it our river - I mean, there's a lot of information that goes out from the Bureau via e-mail. I am just trying to see what information you are talking about.

Sorry, as a method of communication, it is a method that can be directed to a number of people at once?-- Yes.

And it is a written form of communication?-- Yes.

You will have to answer?-- Yep.

So, of those three, then a phone conversation is inferior to the extent that it does not have the benefit of being a written recording of the information provided; would you agree with that?-- Well, a phone conversation is not written, but, as we know, speaking directly is often of much higher value than a written communication, and I have seen many an e-mail misunderstood, I have seen much better conversation and communication going at telephone level with people speaking.

Right. Now, to your knowledge, during the January 2011 flood event, was there an event log kept recording the phone or e-mail contacts between the Bureau personnel and outside agencies?-- Was there an event log? There's logging of phone numbers - logging of phone numbers in and out, so at that level, yes. Logging in my own diary, for example, yes.

Okay. In PB4 to your first statement you include a list of calls between the Bureau and the Flood Operations Centre, and I don't refer to any of them in particular, but there is a document that captures the calls, it records the time of the call, the number that was called, and my recollection is length of time of the call?-- Yeah, correct. We were asked by the Commission to provide from our logs that I was just mentioning, a log of the calls between the Seqwater Flood Operations Centre and the Bureau of Meteorology.

That's fine. So, is there a similar list in existence of calls between the Bureau and other agencies and, in particular, with Ipswich City Council?-- We can prepare such a list and we have access to that list.

Has that been provided so far?-- I don't think so. I don't think it's been requested.

In paragraph 76 of your second witness statement, you refer to a conversation at 11.45 with the Ipswich City Council. If I

can just ask you to-----?-- Yes, I do.

Do you recall who you spoke to at the council?-- In my diary - I mean, I see in paragraph 76 I am just referring to the fact that Mr Stewart and I spoke with Ipswich City Council. We have - the mobile phone number - I have my diary here - and I initially wrote "Tony Trace" against that, and I think I should just check my diary, and then wrote, I think, "Andrew Teat" or "Andrew Teese" in notation. Neither of those people have I met, so I thought at that stage I was speaking to Tony Trace, but I think that what may have happened was that we were expecting a call or whatever from Tony Trace and it was actually Andrew.

Have you seen a transcript of Mr Trace's evidence to the Commission that, broadly speaking, he has no recollection of a telephone conversation of this nature?-- Yeah, yes, I - I haven't seen the actual transcript. I did hear - I did hear that, that he has no recollection of that conversation.

And that he has also made some inquiries of others and was unable to locate anybody else that had a conversation?-- I think - in that - I mean, I would be quite happy - there's two diary entries, mine and Mr Stewart's. There is a log of the mobile number that was incoming, there's a log of the duration of the call, there's - in my diary, there's a log of the substance of the conversation. I think that in the transcripts there was a check against whether the substance of that conversation sounded plausible, so, yeah.

Have you provided a copy of your diary to the Commission?-- I have not provided a copy. I think I've referred somewhat to - I mean, when we say "diary", it's a technical - it's here with me today - it's a technical book in which I keep times and calculations, key phone calls, key messages, and it certainly was a great thing for me to check back on in terms of being able to provide evidence, and then we have the telephone logging system which logs the time and the actual phone number and that matches to my diary.

Certainly, but at this point in time, there certainly appears to have been some confusion about potentially whether or not there was a phone call, certainly whoever participated in the phone call, the passing on of what really was quite important information; would you agree with that?

MS McLEOD: I don't accept the characterisation that there's a question from this witness's point of view about whether there was a phone call, which was the first part of the question built into the assumption.

COMMISSIONER: There were a couple of things in the question too.

MS BRIEN: Sorry.

COMMISSIONER: Perhaps one at a time.

MS BRIEN: Perhaps, Mr Baddiley, then, firstly, I will start with this point: would you agree that information about a rise in a predicted level of at least two metres is important information for Ipswich, the Local Disaster Management Group?-- Absolutely, and I think - I think it is really important to recognise that it was a key point, that we made that announcement at the State Disaster Coordination Committee Meeting between 11 and 11.40, made it very, very clear that this was 18 metres, and then proceeded on a phone conversation with the Ipswich City Council which I have got no doubt occurred.

But you have no recollection as to who you spoke with?-- As I said, I have got two names written in my diary, I have got "Tony Trace", mobile phone number, "Andrew Teat", I wrote, then the substance of the conversation.

Mr Baddiley, armed with information about a two metre rise above a previous prediction, did you send an e-mail to the Local Disaster Management Group to convey that information?-- No, we didn't send an e-mail.

Was there any update of the Bureau's website about this information?-- No, the - the Flood Warning was reissued again at 3.24 p.m., so you are quite right, there was - there was no - that wasn't added to the website.

Why not?-- Why not? Because the situation was changing very rapidly at that time. I have had in my experience a number of occasions where you have to make a call between, if you like, contacting and speaking with - directly with those that are involved that are able to do something versus updating a flood warning, so on this occasion while we had - you know, very, very changing circumstances, we endeavoured to make that very clear at the State Disaster Coordination Committee briefing, a very clear announcement that Ipswich now had moved from - I might say that it moved from being 16 metres, I think, overnight to about - I came back on and said, "Look, this is going 18 plus, because we have got this significant rainfall occurring." That announcement was made between 11 and 11.30 at the State Disaster Coordination Committee, and I just assume the Ipswich City Council was there, but then the intention then was that we would speak directly with Ipswich City Council.

But in a situation such as that that was unfolding on the 11th of January, it is quite dangerous to make assumptions about the fact that a person, for example, a local disaster coordinator, to assume that they may get some information; you would agree with that?-- Well, I thought we'd taken two positive steps, and that was at the formal State Disaster Coordination Committee to make it very clear and, secondly, to make the phone calls.

Do you agree or disagree with the proposition I put to you?-- The proposition was?

That it is quite dangerous when there is a situation that is

unfolding, as was occurring on the 11th of January, to assume that the Local Disaster Coordinator will, in fact, receive that information if it is not given directly to them?-- I can't say - I can't say I do agree with that. I mean, I had, as I understood it, a conversation from Ipswich City Council to the Flood Warning Centre to myself about what was occurring, about the fact that they would then plan for one metre higher than that 18 metres, so I was sort of fairly comfortable that Ipswich City Council officials were aware of the very rapidly changing situation.

If we can move, then, to the warnings, the official warnings that were published on the website? At 9.29 on the 11th of January it was indicated the Bremer River at Ipswich was expected to reach about 16 metres during the Wednesday and then there was a qualification, "High levels expected."; do you accept that?-- Is this going to-----

I can take you to the document?-- Going to come up before me? I mean, that's ringing the right messages, but-----

If you would like to, I can take you to the actual document. Perhaps it can be brought up. PB2-8, bundle 21, and then page 61 of that bundle. About-----?-- Thank you.

-----four-fifths of the way down the page. Do you see that?-- Yep.

If you can just turn the page then? About midway through the page, it states, "The next warning will be issued about 3.30 p.m. on Tuesday."?-- Yes.

Okay. And then the next page, page 63, is, in fact, the next warning, which is at 3.24 p.m. on Tuesday, the 11th of January 2011?-- Yep.

And then about, again, two-thirds of the way down the page, "The Bremer River at Ipswich is expected to reach about 22 metres during Wednesday. High levels are possible as rainfall continues."?-- Yes.

So, on the official warnings, from 9.28 the indication was, leaving aside the qualification, the indication was 16 metres, and then at 3.24 it has risen to 22 metres?-- Correct.

Do you think from the position of usage of the website and utilisation of information being provided on that website that more frequent warnings would have assisted - of assistance as the river height was rising, the predicted river height was rising, sorry?-- Yeah, look, I think - I think if you - if you had a time when you could issue warnings more frequently than that six hours apart, yes. We wouldn't - I mean, when you look at these cycles of flood prediction, getting releases and the sort of negotiation that goes on there, it's hard to bring that back much shorter than six hours, so you infill it with more direct conversation.

But I understood that in your conversation at 11.45 there was

knowledge of 18 to 19 metres?-- At 11.45 there's knowledge of 18 plus metres for the night. So, in other words, it's rained sufficiently heavy for Ipswich to be reacting very quickly to rain in its immediate catchment. So, we are needing to take the prediction upwards. Of course, that qualification was in the early morning warning to say, "16 metre and higher", and I think - and I - and it talked about that the heavy rain is ongoing and it's likely to produce - I better get the words - "Further rise expected all four locations with continued rainfall." So, it's not the notion that we're getting to 16 metres, it's - and stopping there, it's a notion that it's getting 16 metres and higher, but that the rainfall has caused it to react much more quickly and we're into expecting 18 metres that night, which-----

My point is that the - leaving aside the qualification, because it seems that nearly all of these warning notices, include a qualification where there is a - of the relevant ones that we're talking about - include a qualification. So, at about 9.30 in the morning it was showing at 16 metres, and then later in the day at 22 metres, and my question is that wouldn't it have been preferable to have had additional flood warnings posted as that additional information came to light?-- Two comments: it's very important not to leave aside that qualification. That is a very important piece of information, that we will only have qualification there when we have got a developing flood. So, we have got a developing flood for which we don't know where it's going to, it might be going through to 25 metres at Ipswich, as it did in 1893. So, that qualification is exceptionally important. The qualification doesn't appear when the rain has stopped and we can forecast peaks. The second point, I suppose, is that, yes, it would be desirable to update these things more frequently than six hours, but the circumstances of the heavy rainfall in the immediate Ipswich area were changing things very, very quickly and I made a judgment call that we had briefed all those that needed to know under this very exceptional changing circumstance and that we would issue the warning at 3.30 p.m., because at that stage, shortly after midday or so, we're starting to see that this is worsening.

But, Mr Baddiley, aren't the people of Ipswich people that need to know this information, and if the information is available within that time-frame that it ought to be placed on the website that they can access?-- If we had the ability to run those models quicker, update those warnings more thoroughly - there is a lot of work in those warnings - the answer is yes. I suppose if you look at the end-to-end warning system and look at the responsibilities that we looked at earlier, we're not the only agency giving information to the Ipswich residents.

I accept that?-- Yeah.

In relation to then - you have touched on the concept of the qualification of these warnings, so if we can actually turn to that issue? Now, in paragraph 54 of your second statement, you set out the factors to consider in interpreting flood warnings and river height predictions?-- Yep.

And in 54(a), which I understand from what you have said is the circumstance that presently applies, it was a rising flood height prediction, would that be correct?-- Correct.

So at the very last sentence in 54(a) is, "The key message is that the river height is predicted to be reached at or by a nominated time and then exceeded". So, firstly, then, a warning that doesn't include a time, only a day, is open to a subjective interpretation. Would you agree?-- Yes.

Now, Mr Davidson gave some evidence in relation to the qualifying words that it is standard practice. And I can take you to that evidence if you-----?-- Standard practice to?

To add those words?-- Well, what's not said is it is standard practice in the case of a developing flood.

So to a reader, if it is standard practice, might they well set those words aside as just being something that's - not much weight ought to be placed upon them?-- I think the meaning of the words are fairly clear, that it is expected to reach a level and continue rising, that further heavy rainfall is continuing. It is only standard practice while the flood is developing. If at the time that we can make a prediction of the peak, as in 54(b), we will then say so-----

Certainly?-- -----and you will find that that happened the next day.

Okay?-- But I think the - you know, one of the keys is - that's why I wrote some of this, is that there is this absolute confusion that if we mention 16 metres and further rises, that sometimes the whole system looks at 16 is being the upper limit without understanding that the situation is continuing to develop, that 16 metres and further rises, they may occur quicker, really is saying that this is a flood that is developing.

So it is very subjective for the reader as to how they might interpret that then. They might understand the 16 metres but the qualification is quite subjective?-- Yeah, and that's why we have direct conversations wherever we can with the hydrologists in the Local Government. So as you are aware - and I think we haven't entered into this - is that our model predictions are also made available to the Local Government - and we haven't spoken of that. We have certainly made those available to the Ipswich City Council. And on the basis of those model predictions we have discussions with the hydrologists.

On the 10th and 11th of January, the flood warning levels - there was two different qualifications used; one was higher levels are possible, and the other one are higher levels are expected. So does one understand that the intent of the difference in that language is to convey a difference in probability of higher levels depending on which phrase is used?-- It is a subjective reference to that, yes.

So-----?-- So we're more certain when they are expected because we're more certain that the heavy rainfall is continuing and we're more certain that it is going to rise higher, yes.

So when the advice refers to high levels, either expected or possible, what is the reader of the advice expected to understand from that advice regarding the potential magnitude? Is it 10 per cent greater or half a metre greater? Is there some-----?-- The answer to that is that you don't know unless you are - you don't know unless you can accurately forecast the future and you accurately understand the flood risks, so that when Ipswich is at 16 metres and it is raining exceptionally heavily, it could be going - it could be going through to 20 metres, it could be going through to 25 metres, and it could be going higher than that. It just depends where the situation - you know, when the rain eases, and that you can't tell that midway through an event.

Could I take you to paragraph 120 of your second statement? And the second sentence starts with the word "again". If I could ask you to read to the end of that paragraph, please?-- Yes. So this is where we're looking at "strategy came in at 1.31 p.m. and, again, the river level at 22 metres at Ipswich was not predicted as a peak."

Okay. So the next flood warning that had the 22 metres had the qualifier "higher levels are possible". So if one was to read that paragraph where you say that, "The modelling was suggesting a possible height of 22.5 metres", then "higher levels are possible" might mean half a metre?-- If we're referring to the - it may mean that. It may mean half a metre, it may mean five metres. It depends on what forecast rainfall scenario you are using at the time.

But if the modelling was showing 22.5 metres, why would it be issued at 22 metres?-- Because the modelling is not a precise science. There is a lot of judgment goes into running a

variety of scenarios in the model looking at - we may well get a range, you know, quite a significant range of potential outcomes for Ipswich, or for Brisbane, or for where ever. There is then, as I was speaking before, a lot of judgment required to validate and test against other methods that we have. The 22.5 is a guide to using the - whatever scenario you looked at, you would need to look at close detail what factors were put in that.

So if the use of qualifying words is standard practice when interpreting a flood warning, is there not a risk that any implications of those qualifying words will not be fully appreciated by the readers?-- Oh, certainly there is that risk of not fully appreciated, and that's why we have very open dialogues with - and what I have been trying to encourage is very open dialogues between a hydrologist in the Flood Warning Centre and a hydrologist at, for example, Ipswich City Council.

I think one should not forget that it is not just hydrologists in Local Governments that are actually reading this information?-- Absolutely.

Now, Mr Baddiley, are you aware as to whether or not the Bureau has done any long range weather forecasting about the next wet season?-- Look, I am not aware. I mean, it is not - it is not part of my activity. I have read in the press and in any Bureau-----

If you are not aware, that's fine?-- Yeah, not aware specifically, other than the La Nina breaking down and what the likelihood it, and that's all.

Thank you.

COMMISSIONER: There seems to be an issue about this conversation. So are you able to get hold of your diary notes and that portion of the log that I gather will disclose the mobile phone number of whoever rang in?-- The mobile phone number is written in my log, yes - and in the log, yes.

MS McLEOD: We will package that up for you.

COMMISSIONER: Thank you. Mr MacSporran?

MR MacSPORRAN: I have nothing, thank you, Commissioner.

COMMISSIONER: Mr O'Donnell?

MR O'DONNELL: Do you have that table showing projected and actual releases you were shown before? Exhibit 498, I think?-- Sorry, where was that?

It was a table showing projected and actual releases from Wivenhoe Dam?-- Okay, yes, yes.

If you look at the fourth column from the left headed "Difference in release rate between projected and actual releases", we have got a figure in CUMECS. The first is 312 CUMECS. Then the column to the right of that attempts to convert those CUMECS into a volume released in one hour. Do you see that? It is expressed in megalitres? Do you know what the formula for converting one cubic metre per second into megalitres in an hour?-- Multiply by 3,600 effectively, because there is that many seconds in the hour, divided by the - I don't know it offhand but that's effectively it, and then you have got to relate cubic metres to megalitres.

If you multiply it by 3,600 - sorry, I will start again. Can I suggest to you the formula is one cubic metre per second equals 3.6 megalitres per hour? If you multiply by 3,600 what you get is litres per hour?-- Yeah, you are quite right because it is 86.4 divided by 24.

Right?-- Yep.

So if you look against the 2 p.m. entries, 312 CUMECS per second, I suggest should equal 1,123 megalitres?-- I would want to just spend some time doing that calculation, but from what you are saying that sounds correct. Certainly - certainly the equation is flow in CUMECS by 60 minutes by 60 seconds is giving total flow in CUMECS per hour, not in megalitres per hour.

You might want to think about what you just said. If you multiply it by 60 by 60 you get a volume in litres in an hour?-- Yes.

But to get megalitres you have to divide by a thousand?-- I would want to go away and just do those sums.

Will it take you long?-- If I spend some time thinking right now, I might be able to work through that. I think the calculation there is giving cubic metres and there is about 1,000 litres in a cubic metre.

Well, it doesn't quite answer my question. Let me put it to you this way: if you look in the right-hand column, I am suggesting that each of those figures should be divided by 1,000 to give you megalitres in that hour?

COMMISSIONER: I can take expert advice, if you like, Mr O'Donnell, from Mr Cummins who seems to think you are right.

MR O'DONNELL: Yeah. I thought Mr Baddiley as a hydrologist could give that answer quickly.

WITNESS: Yeah, I think what you saying is correct but I want to just stop and pause on that for longer than at this moment.

MR O'DONNELL: If you look at the total on this document, 7,700,000 CUMECS over the three hours, I mean, that's something like three times the entire capacity of Wivenhoe,

isn't it?-- It is clearly wrong.

COMMISSIONER: Okay. So we have just got to drop everything back by 1,000. It is 1.123 megalitres.

MR CALLAGHAN: I seek to amend the document just by deleting the "(ML)" in the column.

COMMISSIONER: So it is litres.

MR CALLAGHAN: So that it is clearly just the flow in CUMECS as described just below that. So if the document could be amended by deleting the reference to megalitres, that will - that would accommodate Mr Cummins' interpretation, as I understand.

MR O'DONNELL: Thank you.

COMMISSIONER: Mr Ambrose?

MR AMBROSE: We have nothing.

COMMISSIONER: I am sorry, I haven't got your appearance.

MS GARRAHY: Commissioner, may I enter an appearance, please, for the Fernvale-----

COMMISSIONER: I am sorry?

MS GARRAHY: May I enter an appearance, please, for the Fernvale Resident Group?

COMMISSIONER: Well, who are you and who are you for?

MS GARRAHY: I am sorry?

COMMISSIONER: Who are you and who are you for?

MS GARRAHY: Yes, thank you, Commissioner. My name is Garrahy, initials M A, solicitor with Maurice Blackburn Lawyers, appearing on behalf of the Fernvale Resident Group.

COMMISSIONER: All right. So you are Mr Rangiah's stand-in.

MS GARRAHY: That's right, Commissioner, yes.

COMMISSIONER: Certainly. Go ahead.

MS GARRAHY: Thank you. Mr Baddiley, still on your second witness statement, please, would you go to paragraph 85, where you talk about flooding in the Fernvale-----?-- Paragraph 85.

85 of your second statement. You talk there about flooding in the Fernvale area?-- Yes.

Would you step through the process by which the people of

Fernvale can go about having predicted river heights at Lowood and Savages Crossing included in the flood warnings?

COMMISSIONER: And can you get a bit closer to your microphone, too, Ms Garrahy?

MS GARRAHY: Yes, Commissioner.

WITNESS: I think the process would be as I have indicated in there, that it is an area that's quite close to the dam. So I think that discussions would take place between the council, Bureau and Seqwater as to how to best handle having predictions for that area. It could be that the Bureau - arising from those discussions that the Bureau would be able to provide a prediction for Lowood or Savages Crossing or do furthered modelling with council or with Seqwater to have another specific location included.

All right. Thank you, I have got nothing further.

COMMISSIONER: Thanks. Ms McLeod?

MS McLEOD: Thank you, Commissioner. Mr Baddiley, can I go back to flash flooding? You indicated that the typical rain to flood time for a flash flood is considered to be zero to six hours?-- Yes.

And that's a typical time; it is not an absolute?-- It has always got the word "typically" six hours, yes.

Now, the Bureau has two roles with respect to flash flooding. The first is to assist Local Governments to establish their local flash flood systems?-- Yes.

And provide advice where appropriate and where sought?-- Yeah, when sought, yes.

And the second is to provide advice of heavy rainfalls likely to cause flash flooding, which is your weather warnings?-- Yes, that's in our severe weather warnings, yes.

Now, are there characteristics typical of flash floods which differ from other floods, such as - people have talked about walls of water, things of that nature, appearing in creeks?-- Yes. Certainly there can be quite complex phenomena that may not be well understood even with a full amount of modelling, but they are very complex phenomena. You have really got to - in respect of looking at flash flood, you have got to understand what might occur in a short amount of time.

Is there a characteristic relating to a wave height or a peak seen above the existing creek level or river level? Is that a particular characteristic of a flash flood, or you don't always see that with flash floods?-- No, it is really quite situational dependent. In some locations you will, you know, as we experience, have a much higher wave, faster wave

according to, you know, topography of the land, steepness of the land, the rainfall intensity. In other locations the flash flood might be much lower, say in flatter country, in Brisbane creeks, for example, would be not as catastrophic.

Now, you were asked some questions by Counsel Assisting about the role of the Bureau in providing advice about flash floods, or the limited role, and a question was asked about whether the Bureau, if it had that local knowledge, or information, or reports from the local area about flash floods occurring, what could it do or what should it do then. Is there necessarily a delay involved in having information fed back from the local authorities to the Bureau in it then responding, verifying and issuing a warning?-- Yes, certainly that's the case. That's why generally flash flood warning is - a lot of the activities is localised to reduce those delays.

And who is best placed to respond immediately to that local information then?-- Well, the way in which flash flood warning systems are structured normally in Queensland is to have the - an official/officials in Local Government accepting the first alarms or alerts that something may be happening in the catchment. Of course, some of them - some of them are, you know, occur with little notice, you know, a very sharp thunderstorm, and some occur imbedded in a wider rain situation for which there might already be some awareness.

To have an effective end-to-end system for flash floods, you start with the gathering of the data, if you like, from the gauges and you end up with the community actually reacting. Can I just ask you to step through the different things that are needed to get from the data to the community response?-- Oh, yes, you can. Let's say we have already got an assessment of what the risk is, we have identified what the catchment is, what the catchment behaviour is. The data network - if you are saying the data network is already installed, so there is a series of generally automatic rainfall stations that report in realtime, and a couple of key water level stations, they will be receiving information all the time - I think this is where you are taking me - all of the time at a computer system that receives that data. At that computer system there should be, and generally is preset alarming conditions, so those alarms - oftentimes we're involved in advising what those alarms are or they come from local knowledge that we want to know that this location is going to reach six metres, we want to know that, or we want to know when this particular rainfall gauge or other rainfall gauges have had 50 millimetres in an hour, or whatever the numbers are. Then there will be established communications of that alarm to - I mean, typically mobile phones and pagers, these days, it might actually generate emails, and so on, as well. So that puts the information of a possible alarm or alert in the hands of a local official, who I assume - and who would then normally tap into the system, the Enviromon system, either from home or at the office, presumably from home, and look to see whether that's a valid alarm, could verify it, maybe talk to the Bureau of Meteorology's 24/7 weather forecasting centre and get some knowledge. Then on the basis of what monitoring, I

suppose, those alarms - usually they are set at lower thresholds - seeing whether thresholds for action occur.

Then taking response by issuing appropriate warnings?-- Yeah, I mean, that's a key part of the end-to-end system, that you have already thought how you are going to communicate, whether it be in the middle of the day or the middle of the night, how you are going to communicate. Generally that requires multiple levels. Some systems involve, as in Ipswich area, Bundamba Creek citizens watch where there is designated individuals on the floodplain that are responsible for their little part, if you like. You could go as - I mean, I shouldn't say it causes extreme - I mean, if it is such a risky place to be and things happen very quickly, you might actually have a siren system for the town.

But a range of possibilities to communicate to the community what the risk is and then you need the community to understand that and react?-- Yes. Generally, more than one communication system, and then an understanding of that community to know what to do and I think in flash floods what not to do.

Yeah. So when you talk about an end-to-end system, you are talking about all of those components?-- Certainly, yes.

From the observation through to the response?-- Yes. The whole system. In fact, it is not just flash flood, but it is flood warning as well. You know, we're really gearing for a community to take action. So if the community haven't taken the appropriate action, then somewhere along that chain something hasn't been as good as it could be. The whole objective of flood warning is to minimise loss of life and damages.

Now, you were asked by the Commissioner some questions about how people communicate local information through to the Bureau, and you talked about the storm spotter network, dedicated phone lines, things of that nature?-- Yes.

On the 10th of January you did receive some information from a storm spotter at Cressbrook Dam?-- Yeah, that came into the Bureau, yes.

And, in fact, that information, which included reference to rainfall, the presence of emergency services, mud slides, things of that nature?-- Yes.

Was communicated then in the 1 o'clock call to the State Disaster Coordination Centre?-- Yes.

And there is a possibility for picking up details about specific locations in subsequent warnings on the Bureau website?-- Yes.

So, for example, you could post a warning about a specific location if that information had come through to you?-- You could. You could attempt to localise the warning indicating,

you know, the area that's taking the impact.

Or, for example, if emergency services or somebody observed the flash flood at Postmans Ridge or Murphys Creek and responded around 1 o'clock, if that information had been fed through to the Bureau, that information could have been built into things that were posted on the website or subsequent warnings?-- Yeah, it could have. I mean, as we go further into the catchment, I mean we have got - and we go back into much shorter lead times for things occurring. So, you know, as we go further up the catchment closer towards the range, things are happening much more quickly around that area and you might be able to. There comes a point where you would be adding little to no value, you know, that typically naught to six hours is closer down the naught end. So things are happening very, very quickly. And there you are relying on a community to be, if you like, situationally aware and really looking for, you know, the escape hatch up - away from the creek, just get to higher ground on your own initiative because it is unlikely that you are going to really get a warning at that point of value through whatever means.

The value, of course, is in having an immediate response, and if the Bureau reaction or the communication to the Bureau and then its reaction comes some time later, it may be effectively worthless?-- Yes, you have got-----

Except the downstream impacts?-- Absolutely. And you have got to minimise all potential delay times of, you know, shuffling information from one place to another.

Okay. Now, I will come to the special phone line in a minute. If a member of the public makes an observation and calls the general phone line - I assume on the 10th and 11th of January the phone lines were very busy at the Bureau. Is there a triage system within the operators who take those calls for sending things through to appropriate sections in the Bureau?-- I wouldn't quite call it triage, other than, yes, the calls are managed according to an assessment of their importance, their relevance, who could best handle that inquiry. Can it be - I mean, there is hundreds of calls coming to the Bureau. Can it be handled quickly? Is it, you know, a quick call for some quick information? Or is it - or is it truly that this person has announced themselves as an official requiring specific information from a meteorologist or a hydrologist, that would be managed differently to just a general inquiry or in fact a media inquiry.

How would it be managed differently?-- Managed differently in that if it is assessed as an important call, if you like, that the caller would transfer that directly into, let's say the hydrologists - you know, to speak personally with a hydrologist involved in that particular flood, or personally to the meteorologist involved in the severe weather warning area. So - yeah, I think, you know, just transferred to the appropriate area and the appropriate person.

Now, local councils and local disaster groups, many of them did have a number to call or a way to contact the Bureau that was not through the general phone line; would that be correct?-- Yeah, the - a lot of local governments for whom we interact with on the flood side have direct, if you like, private, confidential numbers, whatever, to reach the Flood Operations Centre specifically-----

Okay?-- -----directly.

Coming back to the storm spotters, Mr Davidson was very enthusiastic about encouraging storm spotters and the collection of public information, local specific information to come through to the Bureau?-- Yes.

And I didn't ask him about this specifically, but there are ways in which you communicate with your storm spotters, like newsletters, aren't there?-- Yes. Once they have - they're, if you like, enlisted and they volunteer their efforts and we have got their details, yeah, there's - newsletters go out. I think it's called-----

Cumulonimbus?-- Cumulonimbus, I think, and I think one went out just prior to Christmas, just sort of keeping them aware of-----

The September 2010 version of cumulonimbus discusses some recent interesting weather events. I can hand it to you if you need to have a look at it to refresh your memory, but it also gives information about how to submit reports with direct e-mail access and phone numbers to contact?-- Certainly that's the key, to remind - to remind the storm spotters of the way in which they can communicate directly to the Bureau without, if you like, competing with general public inquiries.

Now, if you were a registered spotter and your address information at the Bureau was up-to-date, you'd expect to receive one of these newsletter, Cumulonimbus?-- Yes, that's a simple mail out to that list of addressees, yes.

I have got a copy that's redacted as to the user name, password and those sort of details, but I would seek to tender this newsletter.

COMMISSIONER: That will be Exhibit 499.

ADMITTED AND MARKED "EXHIBIT 499"

COMMISSIONER: Can I just interrupt you, Ms McLeod, because you might want to take up on the line of questioning, but what about the relation between the Bureau and local councils who have got to look out for flash flooding since they're the ones on the present view of things who are going to have to advise their community? Does the Bureau see any role in tipping

local councils off as to what you perceive might be coming their way?

MS McLEOD: Did you preface the question by reference to flash floods?

COMMISSIONER: Yeah, I think I did. I am talking about flash floods?-- We are talking flash floods. I mean, there would be value in tipping off. I wouldn't say that we would be able to undertake - undertake to do that because these things do happen quickly and not necessarily can we forecast exactly where they would - would occur or could occur in the next few hours.

It is just-----?-- Certainly -----

You go on?-- I was going to say that certainly the - I would say that most local governments receive the severe weather warnings for the potential for flash flooding, either directly in their e-mails or faxes or via the State Disaster Management system.

With Toowoomba, somebody at the State Disaster Coordination Centre was advised that flash flooding looked to be imminent but Toowoomba was just left with the general severe weather warning from that morning, as I understand it, and I also got the impression from Mr Davidson that the communication with some councils was better than others, that there were those with whom you do interact regularly and those whom you don't?-- Yes.

What do you think about the role of the Bureau in relation to councils, that sort of advice?-- It's a challenging one. I mean, there's very, if you like, close relationships with many local governments, particularly on the flood side, because we have got this cooperative way of building flood warning systems, but then when you look at - so, when I say many, there might be, say, 30 and there might be 30 plus local governments with which we have a fairly close relationship. We have relationships during the year, not just at operational time, we have relationships during the year at looking after the equipment and advising them when there might be a failure, once a year, maybe inspecting those games. I suppose, how do you scale to 73 local governments that may all need attention - well, half of them as it turned out at the one time? So, I suppose, I have seen a progressive increase in the relationships, close relationships, certainly flood warning between local government and Bureau, but I think maybe we are getting to the point where you have got to, apart from special needs, bringing that back to the systematic process of disaster management system, where the direct conversations are really occurring in the formal disaster briefing, so the State Disaster Coordination Centre is bringing all those local governments in and giving them opportunity to hear directly the Bureau speaking and directly the hydrologists and the meteorologists, rather than us, which we don't do, promise all 73 local governments we are going to give them a call before something happens.

I should say that the CEO of Toowoomba didn't think it would have made a difference if the call had been to him direct, but it wasn't made?-- Mmm.

Right. Thank you. Ms McLeod?

MS McLEOD: Mr Baddiley was asked some questions about the National Disaster Resilience Program. We have provided to the Commission the precis that was asked and a bundle of documents about that. I don't need to put them through Mr Baddiley as such because they're Commonwealth Government documents, but at some point in time - I don't know if they have been made public yet - but at some point in time I would seek to tender those documents. I am just not sure of the mechanism if they haven't yet been published on the website.

COMMISSIONER: Mr Callaghan, can you help me with this? We have a bundle of documents somewhere.

MR CALLAGHAN: I don't think they're in the bundle we are tendering. No, it's not in the material that's to be tendered today.

COMMISSIONER: If I give it a number, can it be produced-----

MR CALLAGHAN: If it's material that we've been provided with, then, yes.

COMMISSIONER: But you are not sure if it is?

MS McLEOD: I don't imagine it's controversial, it's publically available for the most part.

COMMISSIONER: All right. I will give it an exhibit number. We will hunt it out or if it can't be found we will be back to you to get it, but would you just describe it for me, the National Disaster Resilience Program, what is it, a precis?

MS McLEOD: A precis and relevant materials.

COMMISSIONER: It's a wonderful system where you can say "relevant materials" and assume the tender will be accepted.

MS McLEOD: And that includes boxes of materials.

COMMISSIONER: All right.

MS McLEOD: "Natural disaster", sorry not "national", "natural disaster".

COMMISSIONER: So, that's Exhibit 500.

ADMITTED AND MARKED "EXHIBIT 500"

MS McLEOD: Thank you. Mr Baddiley, I leapt up during Mr Callaghan's questioning of you to suggest - this is in relation to the reference to the 1974 flood levels and where they first appeared - and I leapt up to suggest that it appeared in the 9.28 a.m. warning of the 11th of January. In fact, I have found one earlier, at 4 a.m. on the 11th of January, but my question is this: the point of referencing the 1974 flood levels, either below or expected to reach or expected to exceed, is to give some information to those reading the warnings with historical content; is that correct?-- Yeah, absolutely. It's one of our small contributions to interpreting - getting some interpretive information , in our warning that people can take meaning of what - if we're saying 10 metre, what does it mean?

If there's an understanding locally that 1974 levels mean my front yard or down the road, then that is a way of communicating that information to them?-- Yes.

Okay. While I am looking at that 9.28 a.m. warning for the 11th of January, which is at page 61 of the folder you have got open, there's three things I want to highlight arising from the questioning by the Ipswich City Council. The first is the reference to the Wivenhoe Dam providing significant mitigation with river flows from the Bremer and Lockyer catchments combined with releases from Wivenhoe, increasing levels in Brisbane during Tuesday. Now, the purpose of including information about the Wivenhoe mitigation is to communicate what information to the towns downstream of Wivenhoe?-- Well, we have got - alongside this warning, we have got an Upper Brisbane River warning, Upper Brisbane Stanley, which is talking about the very major flooding that is occurring above Wivenhoe Dam. This warning is providing, you know, below Wivenhoe Dam and indicating that there is mitigation of those upper Brisbane River floods, which were very high, which were very high, but they were being attenuated or mitigated, whatever - whichever word you prefer, for the lower reaches of the lower Wivenhoe Dam.

Okay. In that warning under the heading, "Bremer River.", the reference is to a certain peak at around a certain time which is midnight Monday for this warning, and then the statement is, "But renewed rises are expected as rainfall continues. The Bremer River at Ipswich is expected to reach about 16 metres during Wednesday." So, there's a reference to a day, about 24 hours. "Higher levels are expected." If a local council needs assistance to interpret what is meant by a reach or a reach over a particular time, or a probability of exceeding a certain level, does the Bureau provide that service, advice, explanation?-- Yeah, absolutely. I referred before that with many local governments, including Ipswich City Council, we're having direct conversations as we were the previous day. The Ipswich City Council was, I understand it, ringing in fairly regularly, getting the hydrologist's interpretation, so I think there's a real limit to how much information we can put in a public warning. You can see this one is two A4 pages long. So, there is a method

by which local governments can make direct contact. Now, oftentimes that's said at the State Disaster Coordination briefings that occur several times a day sometimes. Oftentimes we will give a full briefing which will amplify on the warnings, give more information and then there will be announcement that local governments requiring more information can ring the Flood Operations Centre directly, and sometimes that's because we can't answer the questions, but it's generally - you know, that's the practice and the reason for my mentioning that there is a hydrologist to hydrologist communication is that what I would like to see encouraged, and have been working towards, is that where a local government has engineers or hydrologists that we'd like to be talking to them so that we can describe what's occurring and what's expected to occur at their location, so they can translate that to their, if you like, their nonengineer hydrologist disaster managers, so you get another layer of expert interpretation, modified by local understanding. So, I think that works well, and I think it's a necessary element that we just can't get enough information to these warnings to describe every nuance of a flood.

Okay. If you turn to the page to the predicted river heights and flows for Ipswich?-- Page 62?

Page 62, the reference there is to - it says, "Ipswich reach at least 16 metres (major) during Wednesday; further rises." What's the significance of including the words "at least"?-- Well, that's, you know, very carefully worded to say that it's based on the rainfalls that we have now, that it will reach - and there may be some allowance for forecast rain in that as well, that we're confident that we will reach at least 16 metres, in other words, rise above that, and that's why we say "further rises". One of the problems with the "during Wednesday" is that the - we're trying to push ahead as far as we can get, so this is written - this is issued 9.30 a.m. on Tuesday. It's looking as far ahead as 24 hours, that - but intervening rainfall will make things occur much more quickly and I raised this in my statement, that the warning systems really need to take account of the fact that large floods can occur much more quickly than what your experience is based on. The other thing, I think, with Ipswich really, in a way, our guidance material would be don't push - don't provide Ipswich with as long a lead time as that, 24 hours let's call it, in the instance of heavy - unless it's predominantly a Brisbane backwater flood, and that's why we're doing it here, but this is about the time where it changed from being predominantly a backwater flood to being a - very strongly influenced by a rainfall flood from its own catchment, and under that circumstance Ipswich will flood much more quickly and, indeed, if you look at 1974, 1974 at Ipswich rose to 20 and a half metres or 20.6 metres in less than 24 hours. On this occasion, we had something like 36 hours, so you know, it is just understanding these things can really shorten their time scales, and that's why we need to have these hydrologist to hydrologist discussions about just things will change.

You mention the briefing of the State Disaster Coordination

Committee at around 11, 11.30 a.m. and the telephone call to the Ipswich City Council around 11.45 a.m., and you were asked some questions about - asking you to characterise or consider characterisation of that method of communication. What was your expectation after the phone call to the Ipswich City Council at 11.45 a.m. in terms of the information you'd delivered?-- Yeah, okay. I think I should just clarify one thing. I am quite certain that the phone call was incoming from Ipswich City Council.

Mmm-hmm?-- So we just need to go back and check, you know, verify that on our logs as has been requested. So, I think it was an incoming call. The - I mean, the substance of the conversation was certainly that you need to be aware that with the current rain that we have got, the expected rain that we have got, it's - it is expected that we will be seeing 18 metres reached overnight at Ipswich, higher than the 16 metres, earlier than the 16 metres during Wednesday, and we went on and had a conversation that how - how is Ipswich planning for this, and what information would you like us to provide, because we're on constant radio briefings.

Through the media?-- Through the media, yes. So, at that time - I mean, 612 ABC had geared up - I think probably they were 24/7 at that point, and we were going on the radio probably maybe every hour for just the local area. I wouldn't be able to confirm that, but it was - it was constant and there was a lot of media activity of hydrologists, like myself, being on air live responding to questions. I asked - you know, what information would - how you are planning for this and what information would you like us to relay about this - you know, drastically changing situation for Ipswich.

And the instruction you got or the request you got was to direct people to the website, and if you live close to a stream, you need to self-evacuate, words to that effect?-- That was - that was the - directly what I had written down for future use and that my concerns were somewhat allayed, that also the person from Ipswich said that they were planning for a metre above what we were predicting; in other words, we were indicating 18 plus, "Well, we are going to bit of - a factor of margin on that, we will go 19 plus."

So, we do see in later media releases or e-mails a reference to 18 to 19 metres. Did you give an estimate of 19 metres or is that taking into account that extra one metre?-- Oh, look, the 19 was the factoring of plus one metre on the 18. We went through from a prediction of 18 plus when we got the new release strategy through to thinking 22 plus, and that was based on the release strategy of 130 plus, plus a forecast of the rainfall, because bear in mind that at this stage we're seeing - you know - well, what turned out to be 300 to 400 millimetres of rain occurring at Mt Glorious and above Ipswich in a band. So, you know, it's a rapidly evolving situation, and if the rain had not ceased when it did, Ipswich and Brisbane would have experienced much higher floods, and that was certainly a concern in the - in our minds when we were writing those warnings.

Now, do you know whether Ipswich had attended the SDCC briefing at around 11 a.m., or do you not know?-- I just don't know. I just don't know, and I suppose on the day I thought, "Oh, they must have just heard me talking about 18 plus.", because the phone call came in as I exited the SDCC briefing, or just shortly afterwards.

The message to call you?-- No, the phone call in from Ipswich City Council at quarter to 12, the briefing started at 11 o'clock and we were - I am pretty sure that the briefing was around about 11 o'clock to 11.40, and then the Ipswich City Council call in shortly thereafter. So, I assumed - I'd made a mental note, "We have got to make - make contact with the Ipswich City Council.", but the phone call came in before, before that, so it came in at a quarter to 12 and again at 3 o'clock, so Ipswich City Council were quite on the front foot. They were ringing us constantly. When I say "constantly", regularly, as opposed to us ringing back, although note on the previous day, I can recall - on the Monday - around 1 p.m. when - sorry, it would be around about 1.30 p.m. after the teleconference I realised that Ipswich hadn't been involved at that stage. I asked - I rang my - you know, our number 1 contact in Ipswich City Council - this is on the Monday - and said, "Okay.", you know, "We have got to get talking, there's an Ipswich flood coming.", and that's when - you know, more regular communications started up. But that was primarily Ipswich ringing the Flood Operations Centre.

Okay. Was it your expectation that having communicated the 18 metres plus to Ipswich City Council that they would pass that on to the people who needed to know within the council?-- Well, clearly, yes, yes.

Thanks, Mr Baddiley.

COMMISSIONER: Mr Callaghan?

MR CALLAGHAN: No, thank you. Nothing, Madam Commissioner. May Mr Baddiley be excused?

COMMISSIONER: Yes, thanks, Mr Baddiley. You are excused.

WITNESS EXCUSED

MR CALLAGHAN: Mr Baddiley, was, I am told, the 167th and final witness to appear in this block of hearings. We do have, however, a number of documents to tender.

COMMISSIONER: I have been given a list. Would it be easiest if I just number them?

MR CALLAGHAN: It would. I might just indicate that there is

one addition to the list which you have which the parties may not have, and that is - the list should be amended with a number "29", which is a document described as the BMT WBM report, entitled, "Technical Report on the December 2010 January 2011 Flooding Within Emerald." I think that will only be of concern to those who were in Emerald, so I don't anticipate any difficulty with this tender at this stage.

COMMISSIONER: All right. Exhibit 501 will be the statement of Rob Keogh, including various schedules; 502 will be the statement of James Grayson; 503, the second statement of Karen Waldman; 504, the statement of Russell Ray Bernitt; 505, the statement of Dirk Karreman; 506, the Brisbane Flood January 2011 Independent Review of Brisbane City Council's Response; 507, the Emergency Action Plan for the EJ Beardmore Dam; 508, the Emergency Action Plan for the Leslie Dam; 509 the Emergency Action Plan for the Coolmunda Dam; 510, the Emergency Action Plan for the Glenlyon Dam; 511, the Emergency Action Plan for the Callide Dam, 512, the Emergency Action Plan for the Kroombit Dam; 513, the Emergency Action Plan for the Fairbairn Dam; 514, the Emergency Event Report from EJ Beardmore Dam; 515, the Emergency Event Report for Leslie Dam; 516, the Emergency Event Report for the Coolmunda Dam; 517, the Emergency Event Report for the Glenlyon Dam; 518, the Emergency Event Report for Callide Dam; 519, the Emergency Event Report for the Kroombit Dm; 520, the Emergency Event Report for the Fairbairn Dam; 521, the letter from the Graham Smith to the Commission of 8th of May 2011; 522, a Response to a Requirement to Provide Information from Michael Clerke, a Local Disaster Coordinator at Bundaberg; 523, the statement of Ian Stewart of 20th of May 2011; 524, a bundle of documents in the brief to Mark Babister, excluding witness statements, witness reports, transcripts of public hearings and transcripts of interviews; 525, the Proceedings of Symposium of January 1974 in relation to Flood in the Moreton region; 526, the addendum of Ronald Reilly; 527, the addendum statement of John Bradley; 528, the statement of Anthony Kleidon; 529, a BMT WBM report entitled, "Technical Report on the December 2010 January 2011 Flooding Within Emerald."

ADMITTED AND MARKED "EXHIBIT 501 TO 529"

COMMISSIONER: Now, there's one remaining ing matter which I should deal with, unless you have got anything further?

MR CALLAGHAN: No, I don't, Madam Commissioner.

COMMISSIONER: In relation to what happens next, we don't have time for submissions in the conventional sense. Instead, the Commission will provide each of the parties by the end of the next fortnight with a summary or summaries of issues and in some instances possible findings and recommendations for your

response. If your interest extends to both dams and preparation and planning, you will get two summaries, a separate summary for each, and possibly if any topic lends itself to another individual summary, you will get a separate summary for that also.

By way of response, I would appreciate it if you would not give me rhetoric, but confine the responses to the strictly necessary. Effectively the Commission just wants you to say whether you agree or disagree that an issue exists, or whether we have missed something, whether any tentative views are right or wrong, or whether any proposals are a good idea or a bad idea, and, of course, why, and those responses will have to be given, because of the timeframe necessary for the first report, within two weeks of your receipt of the relevant document setting out issues, possible findings and recommendations. So, something for you all to look forward to.

We will adjourn sine die.

MR CALLAGHAN: Yes, Madam Commissioner.

THE COMMISSION ADJOURNED AT 12.57 P.M. SINE DIE