REPORT ON PROCEEDINGS BEFORE

STANDING COMMITTEE ON STATE DEVELOPMENT

WATER NSW AMENDMENT (WARRAGAMBA DAM) BILL 2018

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At Jubilee Room, Parliament House, Sydney on Thursday, 4 October 2018

The Committee met at 12.30 p.m.

PRESENT

The Hon. Taylor Martin (Chair)

The Hon. Rick Colless
Mr Justin Field
The Hon. John Graham
The Hon. Natasha Maclaren-Jones
The Hon. Shayne Mallard
The Hon. Penny Sharpe
The Hon. Mick Veitch

The CHAIR: Welcome to the Standing Committee on State Development inquiry into the Water NSW Amendment (Warragamba Dam) Bill 2018. Before I commence, I acknowledge the Gadigal people, who are the traditional custodians of this land. I also pay respect to the elders past and present of the Eora nation and extend that respect to other Aboriginals present. Today is the only hearing that we will hold for this inquiry due to the tight time frame for reporting back to the Parliament. We will hear from a number of panels, including Aboriginal groups and peoples, environmental organisations, academics and other experts, and representatives from the New South Wales Government.

Today's hearing is open to the public anmirrd is being broadcast live via the Parliament's website. A transcript of today's hearing will be placed on the Committee's website when it becomes available. In accordance with the broadcasting guidelines, while members of the media may film or record Committee members and witnesses, people in the public gallery should not be the primary focus of any filming or photography. I also remind media representatives that they must take responsibility for what they publish about the Committee's proceedings. It is important to remember that parliamentary privilege does not apply to what witnesses may say outside of their evidence at the hearing. I urge witnesses to be careful about any comments they may wish to make to the media or to others after they complete their evidence as such comments would not be protected by parliamentary privilege if another person decided to take an action for defamation. The guidelines for the broadcast of proceedings are available from the secretariat.

Due to the short time frame of the inquiry there will be no questions taken on notice. Witnesses are advised that any tendered documents should be delivered to Committee members through the Committee staff. To aid the audibility of this hearing, I remind both Committee members and witnesses to speak into the microphones. In addition, several seats have been reserved near the front for persons in the public gallery who may have hearing difficulties. Finally, could everyone please turn their mobile phone to silent for the duration of the hearing.

CHARLES MUNDINE, Chairman, Tharawal Local Aboriginal Land Council, sworn and examined

SHARYN HALLS, Gundungurra Elder, Gundungurra Aboriginal Heritage Association Incorporated, affirmed and examined

KAZAN BROWN, Traditional Owner, sworn and examined

TAYLOR CLARKE, Traditional Owner, sworn and examined

MICHAEL JACKSON, Archaeologist, sworn and examined

Aunty SHARYN: I am secretary of the Gundungurra Aboriginal Heritage Association and I sit on the Indigenous Land Use Agreement Committee.

Mr JACKSON: I have been working extensively across the Blue Mountains with Gundungurra people for the last 12 years.

The CHAIR: Would any of you like to begin by making an opening statement?

Ms CLARKE: I am a Gundungurra woman. What we are talking about when we are talking about possibly passing through this Act is losing something that is very significant to me and that is what I would like to share with you this afternoon. We are talking about losing a history that is significant to all Australians, not just the Gundungurra people. This is an issue that we all have a stake in.

The valley is home to the only intact painting of a waratah connected to the Dreaming. There are many burial sites, including non-Indigenous, and paintings, meeting places, the Jooriland homestead and more that I would draw your attention to, but, to be frank, this is very personal for me. We are talking about losing some of the places that are my only connection to my ancestors. If this amendment to the Act goes ahead it will be like they were never there. That is very difficult for us as Aboriginal people to fathom, as we believe our ancestors walk this sacred land beside us. If this proposal goes ahead, so much more of our history will be lost to time and the next generation of Gundungurra people will never even know what is gone.

Since I was a little girl my mum has worked with Jim Smith to research our history and to map out where we all came from and where we fit in the story of Burragorang. All the time we are finding new documents and even new family members who are helping us to put together the history again. The Gundungurra people were scattered when the dam was built and, with them, so was the history of our people. There is so much in the valley that we do not even know the significance of yet because those pieces of the puzzle have not been found.

I would like to draw a comparison. If we were to knock down the Opera House, let the Harbour Bridge fall into disrepair, demolish Centrepoint Tower or even shut down Taronga Zoo and kill all the animals all to make way for progress—maybe throwing in some high-rise apartments—that would be like flooding the valley. We would view that as destruction of Australian and Sydney culture and history. It would be devastating and upsetting and, in short, we would not let that happen. So why is this different? Why is it okay to destroy the significant sites of Gundungurra people and the breeding grounds of critically endangered native animals?

The possible future we are looking at is one where we will have nothing to show our children and grandchildren. When we tell them the stories of our people, they will have no way to connect or visualise what we are talking about. This connection to country and to culture is something that is so important to our identity as Aboriginal people. To lose that is just beyond horrifying.

Aunty SHARYN: I am going to talk about a creation story and how Aboriginal people, particularly the Gundungurra people, relate to this creation story. It is the Gurangatch and Mirragan story that forms part of our submission. The submission that we have put in, when you read it you will understand how Aboriginal people have a spiritual connection with the land, animals and all the landscape. This legislation is going to interfere with this. If we again change our legislation to suit another purpose, we are destroying a creation story that is on Sydney's doorstep.

Our creation story is our connection to place. It is also about people who interact with each other. This is about telling a story to the next generations. As it is, we had to give up Burragorang for the water in the first place. We had no way of fighting or doing anything about it. Our people were moved out. As Ms Clarke stated, we still have graves down there under that water. Yet Sydney are drinking water from that whole area to sustain them. If you go back now and raise the dam through legislation changes it is not only going to impact on our story; it also paves the way for other Aboriginal stories across this whole country. Legislation, once it is changed, you have the precedent. Then it allows this to happen to other Aboriginal communities.

Even though they are saying it is all about flood mitigation and all that, at some point—because we had a presentation given to us about development, they were under pressure from development. My question back to this Government and everyone else is: Since when does development run this country? What expense are we willing to go to to destroy Aboriginal heritage? Aboriginal people have been here for thousands of years. We expect to be here for thousands of years into the future. We are part of the oldest living culture in this world. We have in the last 200 years given up more than any other community known to this country.

Yet we are the First People of this country. Changing legislation to suit the fact that people have built houses and been allowed to build houses in a flood zone or whatever makes absolutely no sense to Aboriginal people because we believe that Mother Earth is where everything comes from. We have flood zones for a reason, so that the animals come in; our stories connect back into these flood zones. These stories are our religion. As Taylor said, it is like destroying other parts of different sacred buildings to non-Aboriginal people.

We all have a relative who has either come from the First Fleet or who has married into our family so we all become one but where does legislation come in to protecting Aboriginal people's belief? I do not think it has been recognised enough in this situation. We are trying to change legislation before all the reports have come in. Why? What is the urgency of doing this? Is it because there is going to be an election next year or is this all about money? Aboriginal history is Australia's history. It has become part of the most important thing of this country, so once you change legislation like this, that means you can go and destroy anything you like that is in its path. I cannot see any reason for this legislation change.

The CHAIR: Thank you. Are there any further opening statements before we go to questions?

Mr JACKSON: Yes, I would like to make one. As stated, I am an archaeologist and I have worked extensively in the area. I have been involved in the archaeological surveys to do with the raising of Warragamba Dam. I was brought in at the request of the Aboriginal community because I have worked extensively with them through the area and have a lot of knowledge of both the archaeology and Gundungurra stories in the area. I just let you know that in terms of the environmental impact statement [EIS], I have signed confidentiality agreements and I was reminded of that in a government email last night so there are some questions I will not be able to answer.

But what I can talk about is my extensive knowledge of the Gurangatch and Mirragan songline, which a songline on Sydney's doorstep which travels for about 220 kilometres. It is probably one of the most intact creation stories close to a major city in this country. It is as sacred and special as areas of the Holy Land, as other Indigenous landmarks such as Uluru, Kakadu, Kata Tjuta and all of those places. I can talk about those; that is all on the public record. I can also talk about my knowledge of the archaeology of the region, what is at stake in terms of the archaeology and the potential impacts to it from the amendment bill and also the impacts for floodwaters on same. Those are the things that I can talk about today.

The CHAIR: We will open with Opposition questions.

The Hon. MICK VEITCH: Thank you all very much for your attendance here today at this very short and sharp inquiry into the legislation. I want to pick up from Mr Jackson's opening statement. What has been your involvement with the local Indigenous people and, more importantly, the archaeological sites that you spoke about that may well be inundated?

Mr JACKSON: I have been involved for about 12 years in a professional capacity within the Blue Mountains region and a large part of that has been in the catchment area. Some of that has been in areas which will be directly impacted by this proposal. In particular, we have looked at the Gundungurra stories in the area and examined the archaeology surrounding some of those stories. On the one hand, we have these wonderful intact Aboriginal stories right on Sydney's doorstep but we do not actually know the other side of the coin: what is the actual archaeological information and what it shows about the cultural practices in relation to those stories. We have looked extensively across the mountains, at parts of those stories, some of the sacred waterholes and also in hinterland areas, so areas actually surrounding those places as well.

To date, in the last 10 years in particular, we have actually documented and recorded close to 900 new Aboriginal sites across the Blue Mountains that were not previously known about or recorded before our investigations. That is my experience. In terms of areas that would be inundated by the water, I know of lots of sites outside the EIS process and what has happened in that. I know and we know of lots of places that would be destroyed by that and a lot of those would be destroyed before we actually even know what is there and before they have been properly investigated.

The Hon. MICK VEITCH: As to the documentation of those sites, how long does it take? How many of them have been formally documented and how many more are there to be documented?

Mr JACKSON: In terms of the inundation area?

The Hon. MICK VEITCH: I am mindful of your opening statement, so, yes, with what you are allowed to say, I guess.

Mr JACKSON: With what I am allowed to say, my estimate is that in the inundation area there is probably at least 500 archaeological sites with tangible evidence but you have to remember that it is one big site because the whole area is covered by a creation story. In 1960 at least nine sacred waterholes along that story were flooded and also parts of that journey to linking those waterholes were flooded. Areas in the hinterland around there, though, remain intact, so to understand the cultural practices related to them we actually have a rare opportunity to actually go back and have a look at those areas now to actually get an insight into the cultural practices around those flooded sections. If the amendment bill goes ahead, we will lose all of that.

The area we are talking about, at the moment about 70 kilometres of the story has been flooded by the original Warragamba Dam. The proposal would flood an extra 50 kilometres of the story, which is about half. The story travels from the Wingecarribee-Wollondilly River junction all the way towards north of Oberon. It goes through a large area and it goes through the heart of the impact area. At the moment I feel like there is probably around about a further 200 kilometres that you could investigate around aspects of that story and that is about 100 kilometres of the actual watercourse, of the actual story, and you would have to check either side of that, so in effect it would be about 200 kilometres of the cultural landscape.

The Hon. JOHN GRAHAM: I have a question to anyone on the panel. You made the point this morning in your submissions that if this change happens, the sites will be lost forever but this process is happening very, very quickly, very urgently. What consultation has occurred with your communities, and are you comfortable with the level of consultation to date?

Aunty SHARYN: I can answer that from our organisation. We first knew about this EIS, around November was one meeting but before that people came from the dam to do a presentation—I think it was in August 2017. That was the first we knew about it, which is really interesting seeing we have an Indigenous Land Use Agreement [ILUA] over the land, and I would have thought that this whole proposal would have been brought to the table as soon as they realised that there was an ILUA over the land since we signed it.

The Hon. JOHN GRAHAM: Because the whole purpose of that agreement is to drive that consultation?

Aunty SHARYN: The whole purpose is to consult properly beforehand. We were informed that, "This is just a presentation; this is what we are going to do." It is not about what sort of feedback we had an opportunity to put in at the beginning; we had no opportunity for that, so that side of it—I am not happy at all. At the ILUA meetings that was made very clear to WaterNSW. That is pretty well it.

Mr MUNDINE: Just to add to that: As Aunt said, in August last year, and of course we were just told, along with the Local Lands Council, that yes it is, the presentation happened, that is it. No consultation about what was happening. It goes back 20 years nearly where we asked the question—I know personally I did ask the question of the Government at the time and also the people that were doing all the developments of the Western Sydney areas with the housing and that—where is all the infrastructure coming from, such as water, electricity, sewerage et cetera, et cetera, all those? We were told politely, "Don't worry about it. It's none of your business. We just want youse to look at the development, and where the housing and so forth is going in you do your site surveys and whatever and give us agreement and we'll go ahead."

In other words, we have never been consulted about every little aspect of it. We need to know though so that we can work with youse, for one, and we can get a proper resolution out of it. It has already been said about the sites and all that; they are just the tip of the iceberg. There is a whole thing—storage going back years and years. I do not come from this part of the world but I have a responsibility here. I am the chair of the lands council which this valley falls within our thing, and by legislation I have to look after it for the traditional people and the people that are coming to live here, and guess what? You are part of those people who come to live here so you are part of my responsibility under that legislation, so bad luck.

The Hon. JOHN GRAHAM: Thank you for those comments. I have another quick question for Mr Jackson. You referred to a direction you have been given from the Government in relation to your evidence. Who issued that direction to you?

Mr JACKSON: It is an email from the Government last night just to remind me that I have signed it.

The Hon. JOHN GRAHAM: When you say, "the Government", who from the Government? From what agency?

Mr JACKSON: The Snowy Mountains Engineering Corporation [SMEC].

The Hon. PENNY SHARPE: Thank you for coming along today. I wanted to explore the Indigenous Land Use Agreement after what you have said. The Government first raised this issue in relation to Warragamba Dam in 2012. They then went on to negotiate with you, I assume in good faith, the Indigenous Land Use Agreement where there is a range of commitments that government makes. I am wondering if you could talk me through that.

Aunty SHARYN: Our Indigenous Land Use Agreement is based on consultation in a meaningful way. In my submission I have put down a couple of points.

The Hon. PENNY SHARPE: I have seen those.

Aunty SHARYN: They are the bases of why I am here. Because of the Indigenous Land Use Agreement we have a responsibility to make sure the process is done properly. We feel that the process has not been done properly through the way the ILUA has been set up.

The Hon. PENNY SHARPE: If I can just go to that: When you were negotiating this, the Government was well aware that there were plans around the dam. Was it ever raised with you during that process?

Aunty SHARYN: No, never. A Water representative, ever since it has been signed, back in 2014—in June it was signed and came into effect early 2015—the representative who comes to our ILUA meetings never brought it up once until that first meeting when everyone turned up. We just felt that, dare I say it, we have been shafted. We should have had the information straight away. And even while this was going through the ILUA, I would have thought there would have been some sort of consultation anyway with us because we were already talking to people like Water, people like National Parks. To my knowledge—I do not know if it is 100 per cent right—maybe they did not know it either. I do sit on other committees.

The Hon. PENNY SHARPE: You are not hard to find.

Aunty SHARYN: The information could have got to Aboriginal people who were going to be impacted, so that we could get that information back out to other Aboriginal people to get their feelings about the whole thing.

The Hon. PENNY SHARPE: I would have thought in the discussion of the Indigenous Land Use Agreement too that there were commitments made around consultation but also how the land is managed with the various agencies that are there.

Aunty SHARYN: We are supposed to be doing joint management through this whole process. I will be honest: I do not think Water are coming to the table in the right spirit, the way I feel at the moment, and Infrastructure as well. I think they feel that, "We'll tick another box." Aboriginal people do not like being in a box and just being part of a process and "We'll tick you off."

The Hon. PENNY SHARPE: Mr Jackson, could I ask you about the Aboriginal place nomination? Where is that up to? Can someone answer that?

Mr JACKSON: Sharyn might be able to.

Aunty SHARYN: What happened on 23 July this year, we put the nomination papers in to nominate the whole area, as you will see in your papers, and then they decided they could get it to an Aboriginal meeting.

The Hon. PENNY SHARPE: When you say "they", who is "they"?

Aunty SHARYN: That is the Office of Environment and Heritage, the heritage people at OEH. They took it straightaway to a meeting because I did not know the timing was so critical at the time to have this done. So they got it onto that meeting and they are proceeding with it. They were directed to proceed with the process of the nomination, and I have not heard for probably four weeks or so, but the end result there was they were going out there to start doing all the mapping themselves, which would be a very easy process.

The Hon. PENNY SHARPE: It looks like there is a lot of work already done.

Aunty SHARYN: Mike did the mapping for us. We went to a lot of trouble, we got it in. The reason behind the creation story going to this level is the fact that we did not think we would have to do this because we had an Indigenous Land Use Agreement, therefore we thought all of our sites, everything, would have been intact

for the future. So we decided to get the story out there in a very public arena as much as possible because it is more than just a creation story; it is about our ancestors before us and it is about being able to take all the generations that come after us to place us and say, "This is what happened at this waterhole." Off a creation story comes many stories. Each story has its own place.

I was told by Water that you can tell a story anywhere. In Aboriginal culture you cannot tell a story anywhere. The best place to tell a story is in place, and children, adults, it does not matter if you are Aboriginal or not Aboriginal, you will understand the story because it is about the land, it is about the animals and it is about how we connect with each other right through these. Now we are in a situation, even though we have ILUA, where we are going to have another cut right through a story. That is like ripping your heart out.

The Hon. PENNY SHARPE: Can I just confirm with you which of the Ministers were involved in the signing of the land use agreement?

Aunty SHARYN: I will have to look at it. Maybe I did not bring the document. I can tell you who the parties are: you have got Forestry, you have got National Parks, and Blue Mountains City Council are heavily involved in it as well as part of the government agencies that are there.

The Hon. PENNY SHARPE: And Water?

Aunty SHARYN: Water is one of the main stakeholders.

The Hon. PENNY SHARPE: Given it is central to the whole thing.

Aunty SHARYN: That is interesting. Water and land for us is the same. They connect to each other, so you can not separate the two.

The Hon. PENNY SHARPE: That is good to know. I find it extraordinary that the agencies are supposedly negotiating in good faith and they have never actually spoken to you about it. I have a quick question for Mr Jackson. You indicated you think there are 500 sites approximately, given the detailed work—I appreciate the work in all of your submissions, this is well documented, a lot of time we do not know what we do not know—how long do you think it would take to document the areas, to do it properly?

Mr JACKSON: At a basic level, to walk the country.

The Hon. PENNY SHARPE: I assume you have to do that.

Aunty SHARYN: You cannot do it any other way?

Mr JACKSON: My estimation all along has been between 800 to 900 kilometres of foot survey would be required. I always thought that with a crack team and no delays, the ability to camp in the area, set up base camps and do the work, you would probably be able to do that in 90 to 100 days.

The Hon. PENNY SHARPE: It is a significant task if we are serious about mapping it?

Mr JACKSON: It is a significant task.

Aunty SHARYN: It is a huge mapping project. Even with the new guidelines that OEH have got in, where they want Aboriginal people to map their country and hand it over, yet we are in a situation where we should be mapping this country properly and we are not really doing it. The interesting thing, back in 1989, when it was Sydney Water, they had a report done by archaeologists and they put in that report that it would take over 12 months to survey the area properly, yet we are being given nothing.

Mr JUSTIN FIELD: Thank you for being here today and the detailed submissions at such short notice. I am picking up on what you have said already just to be clear; a lot of mapping has been done and work has been done on documenting the story. Is it the case that sites could be lost as a result of inundation from this project that no-one knows about at the moment?

Mr JACKSON: Yes, of course. There would be a lot of sites that would be lost. There would be rock art sites, axe grinding groove sites, ceremonial sites, scar trees, sites we might not even know what is there at all, that is a basic overview. Without a doubt. One flood inundation could destroy archaeological deposits that demonstrate the deep antiquity of Aboriginal connection to this country and to this part of Australia, the Sydney Basin, which would have information about how they managed their land, how they survived through climate change, and all that information. In terms of rock art, water dissolves the binder of Sydney sandstone. Sydney sandstone is being eaten up by water. Water on to rock art basically dissolves the silica that is holding the sand grains together and then the grains are left exposed and they wash off. One inundation of rock art sites, particularly in permeate sandstone, which is the sandstone that is dominant in the impact area, that peels off like paper. We

are talking about the loss of hundreds of sites and I would say thousands upon thousands of square metres of archaeological deposit.

Mr JUSTIN FIELD: The government makes the case that this would result in temporary inundation but in terms of cultural heritage temporary inundation is permanent?

Aunty SHARYN: It is 100 per cent permanent.

Mr JUSTIN FIELD: I hear what you say about the consultation and it has not really been a consultation, the decision largely, in your mind, has been made, but the proposed amendment bill talks about an environmental management plan in process that would be implemented under the new arrangements. Have you been consulted at all about how cultural heritage might be considered under the development of an environmental management plan to respond to inundations?

Aunty SHARYN: Not to date.

Mr MUNDINE: No.

Mr JUSTIN FIELD: No-one from government has asked you for advice on the bill?

Aunty SHARYN: I have not spoken to anyone from government. I have only spoken to Niche, the archaeology company subcontracted from the Snowy Mountains engineering company. No-one has approached us in any form.

Mr MUNDINE: Not the lands council. Just on that, it is very hard to get any two government agencies or government departments to agree on anything. You say "the Government", but the agencies themselves are totally different to one another: It is a catfight over "Someone is trying to steal my little bit of turf." I remember with the Georges River, the top end of that, I could not get the water people to talk to the national parks people, to talk to the local government et cetera—it went on and on—about who was actually responsible. And we say, "No, you are the government: You are responsible, get your act together and come and talk to us." It is 18 years now we have been trying to get the Darawank Nature Reserve management plan in place. They cannot get their act together to give us a draft of something to look at. That happens right across the whole area. Even this here when they talk about the Coxs River when they call it an Aboriginal site.

Aunty SHARYN: Aboriginal place.

Mr MUNDINE: I asked them to be included into that to have some idea, because on my mum's side of the family I have a connection to that area. I have one email which I sent and I never heard a word back and that was in the first days when they were going on about that naming. One agency will not talk to the other.

Mr JUSTIN FIELD: You do not have a single point of contact with government about this proposal that you are able to contact, should you have any issues with the process or engagement with the consultants has not been adequate. No-one has said, "This is your point of contact for engagement with government"?

Ms BROWN: No. I was switched from one person to the other. It was, "Talk to Niche", Niche would put you on to Sydney Water, Sydney Water would put you on to New South Wales water and go back to Niche again—and never got an answer. It was just a big circle.

The Hon. MICK VEITCH: What is Niche?

Ms BROWN: Niche is the archaeology company doing the survey.

Mr JUSTIN FIELD: That is the survey for the EIS itself?

Ms BROWN: Yes.

Mr JUSTIN FIELD: The evidence we have heard is that there are sites that probably will not get surveyed as part of the process. Have you spoken to Niche or Infrastructure NSW about how that is going to be resolved in terms of producing the final cultural heritage aspects of the EIS?

Aunty SHARYN: I have spoken to Niche. The first meeting they came and told us that they were going to do the whole survey in five days. I just laughed and said, "Come and see me in five years." The attitude is people do not understand Burragorang—that is the first thing. You see a map and think, "That's not very far," but when you are on the ground walking it and recording sites the whole situation changes 100 per cent. You have to understand you are doing paperwork as well. You are not only walking; you are trying to write up what is there and keep walking and get as much done in a very short time period, an eight-hour day—an eight-hour day where you could spend two hours to get to the place you left off. You drive that way in and it does not leave much

because you have a time limit when you have to start and finish. Our biggest argument was we should be coming in different directions to save time. That never happened to date. We are still trying to negotiate because they are trying to come in another way. One phone call to national parks to say, "We want to come through that gate and come in that way." It is not rocket science what we have asked; it is simple questions about access as well.

Mr JUSTIN FIELD: Has the survey work been completed or are you still negotiating?

Aunty SHARYN: No. What has happened is at the moment they were supposed to be out there today and tomorrow on a boat to go and record old sites that were not recorded in the first 25 days—to try and find them and actually revisit these sites and rerecord them. As Mr Jackson said, we have not really covered much of the area that is stated that we are supposed to go to. From our point of view, at the meeting I said, "If you are going to do this survey, you have to survey the whole area." It should have been in our minutes. I did not bring the minutes from all those meetings. "You have to survey the whole story. If you are going to be honest about the way you do this project, you have to record it, and you have to record what is out there." Because it has never been done, for a start, properly. "You need to use modern scientific methods with traditional knowledge and come up with something." And for us, the "come up with something" is we all oppose this until we cannot oppose it any longer.

Mr JUSTIN FIELD: Do you feel that the survey work is really just being done to record what is ultimately going to be destroyed and lost?

Aunty SHARYN: Yes, I do. That is how I feel about it. I have never been so passionate about a project. I have been doing surveys and mapping our country with Mr Jackson for about 12 years, and with other archaeologists. I go out, do heritage stuff for our organisation. There has never been a more—what is the word?—I have never been so passionate as I have about this survey, mainly because it is Burragorang, but it is more than that: It is more to the fact that I do not believe it has been done in the true spirit of an Aboriginal cultural heritage survey.

Mr JUSTIN FIELD: Did you want to add something, Ms Brown?

Ms BROWN: Just about the consultation. We were not able to get on site for the survey. My family had at least six properties in the valley. We were told we could still have consultation, we could let Niche know about artefacts and sites and that sort of stuff. That was all good. But we asked for photos, because I cannot tell them what is there if I cannot see what they are looking at. And they basically will not let us have photos because it is a working file. I am not exactly sure how they expected us to have consultation, because we could not see what they were looking at.

The Hon. RICK COLLESS: There was a general comment from all of you about the issue of permanent versus temporary inundation. First of all, the proposal is not seeking approval to build this wall higher. It is to facilitate doing environmental impact statements and all those studies that you have been talking about that have not been done. At the moment, there is a prohibition on doing that under the National Parks and Wildlife Act for temporary inundation of national parks land. All this does is facilitate those studies and EISs being done as we go forward.

To get back to the inundation issue, what they are talking about is a maximum of 14 metres of inundation above the full supply level of the dam, which would equate to something like the 1867 flood, or somewhere in that vicinity. There has not been a flood of that magnitude since 1867. That tells us that it is a reasonably rare event, and there has not been a major flood in the Hawkesbury Valley for 25 years. Let us think about the issue of improving the flood safety of those people who live downstream for a one in 20 year or one in 50 year flood, which may only relate to two or three metres of inundation of that park. How do you arrive at the conclusion that the full 14 metres is going to be regarded as a permanent inundation?

Aunty SHARYN: We are working off the maps that are provided to us and off the presentations that they have done to our organisation when we have ILUA meetings, and when I have been an observer at a world heritage meeting. They are telling us that this is what is going to be destroyed. It is not the other way around. We are not telling them that it is going to be destroyed. All their maps are around what is going to be under water when the dam is raised and it is let go. Their mapping system has predicted how this is going to affect the land. It is not us who make maps, they do.

The Hon. RICK COLLESS: I understand that. If we take, for example, the 1867 flood, which was estimated as being one chance in 500, which would be the 14-metre inundation level? If that does not happen for another 500 years, what is going to be the long-term impact on that inundation to the land?

Aunty SHARYN: Long-term, for us? Or for the people who live where they should not?

The Hon. RICK COLLESS: For the land itself.

Aunty SHARYN: It will take all the silt and everything down and wash everything around. If you go for a walk down there, you will see the build-up of undergrowth and everything. Even if it is not going to be a 14-metre high addition to the dam, even if it is a lower one, it is going to take massive amounts of silt from the top of the soil and it is going to wash down everywhere and create another problem. What guarantee really has anyone got that all this silt and all this build-up of undergrowth that is already down there is not going to impact on something else? When the dam was built, we all know that they cut down all the trees so it would not destroy the dam once it was built. I do remember them doing all the clearing, and a lot of people did it to clear it. That is when the scar trees and carve trees were cut down, even though some survived. That will always happen. This is a country that has floods, has fires, has rain events, just like every other county across the whole planet. The difference here is we are interfering again with—our argument here is, really, legislation can get changed to suit other purposes and we are concerned also about what other purposes this legislation change is going to have on not only us but other people.

Ms CLARKE: I was just going to add to what Aunty Sharyn said about the silt and sedimentation as well as what Mr Jackson has already said about the effect of the water on the rock art. Even if we are not talking about the complete inundation of the 14 metres, as you said, that is a very rare event. Even if the water comes up to half of that distance, the spray from the floodwaters onto the art, for example, can be as devastating as a complete inundation. And it only takes that small amount of moisture, as Mr Jackson said, to start to dissolve what is holding these really already very fragile artworks on the wall. Even if we are not talking about the complete wash through, there is still a damaging impact even if there is only a temporary inundation of that small amount.

Aunty SHARYN: You get all the moisture coming up.

The Hon. RICK COLLESS: I take that as right. When you look at the speed with which water travels through a large storage like that during a flood event, it is very different from the speed that it travels when it gets down below the dam and it is travelling in the river valley itself. There is a huge amount of water in the dam, so it will be moving a lot slower. What do you mean by the splash-up of the flood? It would not be like a raging torrent through a narrow river valley once it gets into the dam—sure, up above it is, but you cannot do anything about that, because that is up above the storage level.

Ms BROWN: I disagree with that.

Mr MUNDINE: Same here.

Ms BROWN: I think going through the valley the water really does move through there.

Mr MUNDINE: Above the dam itself, as you said, coming down near the storage area, the creeks and river ways that feed it, in some storms that come through and the water comes down you have over a metre of water rushing down there. That is a metre that is building up speed and whatever, and when it hits that large—

The Hon. RICK COLLESS: Reservoir.

Mr MUNDINE: —molly that is sitting there, there is going to be some form of displacement, and if there is anything lying in the bottom it will be displaced also, so you cause another kind of damage. If you look at all your dams that are built around the world, people hate the idea of that ever happening because it does cause problems to the foundations of the dam walls, which you do not see until it collapses. That is what they are all worried about. I know in America the Hoover Dam—they are just waiting for another one of them to happen—and just imagine if that went. That is a horrible thing. We would hate to see that here. If anything ever happened to that wall at Warragamba, Penrith for a start has got less than 10 seconds of warning to get the hell out of there.

You have got to look at the worst possible case scenario and try and try to work back and try to stop it from happening. You cannot just say, "Oh, no, it won't happen." No. You have got to say, "Right this will happen sooner or later." Mother Nature is a horrible woman. She will come out and slap you, so you got to say, "Right. This is the worst. Now, how do we stop this, this, this and this?" Move back, back, back until you get the best case scenario, which is hopefully it will never happen.

The Hon. RICK COLLESS: But we do know that it is going to happen. There is only one certainty when it comes to floods and that is that there will be a bigger one than we have already had.

Mr MUNDINE: Oh, that is right. It is always a bigger one, yes.

The Hon. RICK COLLESS: There is always a bigger one that is to come, even with the 1867 flood. But that is the very point of this legislation—to allow those studies to proceed and work out what the impacts are

going to be, not only on the people who live downstream in Windsor and Richmond and so on, but also the impacts that there will be on the environment and the cultural heritage issues that are there. The Minister clearly made that statement in his second reading speech. He specifically mentioned the Aboriginal cultural issues that need to be fully assessed. That is what this legislation is about—allowing those studies to proceed before any approval is given for anything to be built or expanded on Warragamba Dam.

Mr MUNDINE: Yes, well, this study is the same. Once approval is given, what type of depth do you want to add to that? I think that is what Aunty Sharyn was trying to say.

Aunty SHARYN: Yes.

Mr MUNDINE: What type of depth in the study do you want to go to? You see, I have been involved with environmental impact studies and that over the years. The worst one I had to do was Holsworthy going into the airport. We were given a very short time—10 days, actually—and it was 19,000 hectares we had to do. That is impossible. You got about, I think it was about, 28 per cent of it done and we were virtually running. We only quickly photographed—we never had time to sit down and draw, which we should have been doing; drawing all the sites on that, but at least we photograph them—and we only got I think it was about 2,000 sites. We know there are probably more than that—thousands upon thousands of them. That is in that area. It was a major living community that was there.

It was the same around the Burragorang Valley—same thing. There was a living community there. So, what have we lost already? What are you willing to lose again? It is not us losing it. We do not want to lose it. It is what you want to lose. That is the thing. I can go back and say, "Righto, it's not only Aboriginal heritage. What about your own heritage—the things that were there?" I have been down and actually into it there. When the water was down to the low mark, we went down to have a look at the old silver mine and all that down there. And it is, hey, the history that is in that thingamabob that you just do not—that most people would not even know existed. I am not talking about the Aboriginal side. We know that. Now, what about your history?

When we are talking about site surveys, we are talking about if you walked through Sydney here and stopped at every block of sandstone, whatever, and documented everything about it, that is what you have got to do because that is the story of not only just the area but also the story of the people that lived there, have lived and will in the future live there. You are continually doing that. You are not knocking down things to rebuild. You are preserving because from preservation comes better things. If you are knocking it down to build something better—I know from the architectural world today they are talking about, "Oh, we're building things but we're not building them to last, you know. In 10 years time, we'll knock it down and build something better." That is garbage.

Look at the sandstone buildings you have got around the place. This building alone, how old is it? It is probably going to be here for another 2,000 years. That is what we are looking at. Aboriginal history—we are not talking about even a couple of thousand years. When you are looking at the land itself, the plants and everything, they evolved over 70 million years, and you are willing to just—gone.

The Hon. RICK COLLESS: I take on board what you are saying, very sincerely, and I think the point that Mr Jackson made about taking up to 100 days to do that survey with a proper team in place is obviously what needs to happen. In terms of the five days you were talking about, Aunty Sharyn, with the environmental impact statement [EIS] I do not think that is ever going to happen.

Aunty SHARYN: No, it has not.

The Hon. RICK COLLESS: It will have to be a long process to make sure it is a proper process that is gone through.

Aunty SHARYN: It did not happen because then we got it to 25 days. Now they have decided that they have to go and find the sites that were not found.

Mr JACKSON: That is, the previously recorded sites.

Aunty SHARYN: That is what is on already what they know about. But the reality is Water had a study done way back in the 1980s and it said that it would take—and that was from two very well-known archaeologists in this country—that it would take over 12 months to do a proper survey.

The Hon. RICK COLLESS: Which is getting close to half a century ago now, is it not? Technology has moved on a long way. I understand it has moved on a long way from that.

Aunty SHARYN: No. Walking country does not change.

The Hon. RICK COLLESS: I understand.

Aunty SHARYN: You are walking country for thousands of years the same way. You might have a different technique of recording, but you have still got to record it no matter what. We have cameras that are better than they were. The time will take the same, whether it was 100 years ago. I probably walk slower than what people walked 100 years ago, and I think everyone in this room would, because we drive cars.

Mr JACKSON: Can I just say that the survey is just the start as well. That is just the basic start. I know it is important to do these studies and everything, but there is a bit of a problem I think with the process of archaeology. It is like, right, we have gone; we have taken photos, we have recorded: destroy it—as though that is good enough. The best way to know are places to walk it and to be there. The best way to understand it, to feel it, to be welcomed into it is to actually go there. One thing I have discovered working with Indigenous people is the willingness to welcome you in and to be part of that country and part of that culture. I have been with lots of different Aboriginal groups.

I think, yes, the survey—100 days is just the start. I have one comment on your 14 metres as well and something that the Hon. Taylor Martin said about the splash on the waters. If you raise the body of water up into proximity of some of these places, you are increasing the evaporation of water onto them. You only have to walk around Warragamba Dam and see the sandstone in that area that is close to the water, rock shelters that should have rock art. The rock has just been eaten up by the proximity of the water. It is not even water coming through the rock; it is the evaporation. In a 14-metre flood, that is actually what you are increasing.

You are also destroying the deposits, as I said, so you are stripping that away. What you will end up with is a dead zone, basically. You will see lots of archaeology because the sand—what is in a metre deep deposit will be reduced to nearly zero. You will have thousands of years in one layer instead of thousands of years in a metre or two metres or three metres. With one 14-metre flood, you just have to stand at the Three Sisters and look out into the Kanimbla Valley and you will see a dead zone in the Kanimbla Valley. Welcome to the Blue Mountains World Heritage area. That is a great view, isn't it. It would only take one big flood for that to happen. One of the second-most photographed natural places in the country would have a dead zone right front of it.

The Hon. NATASHA MACLAREN-JONES: I just have a couple of questions following on in relation to the consultation process. Mr Mundine, you mentioned that you were first engaged in August last year with the presentation?

Mr MUNDINE: Yes, well, I was there.

Aunty SHARYN: No, we were.

Mr MUNDINE: They were.

Aunty SHARYN: They were in it.

Mr MUNDINE: We were only advised that it was happening.

Aunty SHARYN: That's it.

Mr MUNDINE: And that was all that happened. We never got anything else at the lands council. Hello, what are we going to do now?

The Hon. NATASHA MACLAREN-JONES: And the presentation was about 12 months ago?

Aunty SHARYN: Yes, it was. It was a presentation that goes out to everyone across the board. They were going around doing presentations at different locations, basically.

The Hon. NATASHA MACLAREN-JONES: At the time were you asked for any verbal or written feedback in relation to that presentation at all?

Aunty SHARYN: We made our comments at the presentation of how dissatisfied we were with the whole process.

The Hon. NATASHA MACLAREN-JONES: I am mindful of the fact that, as my colleague mentioned, the survey is being conducted so more information is being sought. I am keen to know how this could be improved to ensure your comments are being heard by the departments. Is there more that can be done?

Aunty SHARYN: Yes. I think we have to do a contra. We need to actually do the survey properly. We need to then collate everything that has been there. At the moment we are working under too much time restraint, not enough time to do what we are supposed to do to gather more information. Because at the moment, 25 days for that many areas is impossible. And there are other people you have to talk to. Obviously the land council has not been spoken too, and there must be people in that area who belong to a land council who might have stories

that need to be recognised as well to form part of the EIS. But at this stage, as far as I can see or have seen, that has not happened yet, from what Charles Mundine has been saying here today. Because he is in the same boat as our organisation.

The start of the process was done wrong. We are in a catch-up situation now for our heritage and how we are going to work out the right plan to actually protect it. That is the most important thing today. You can look at it now and say, "There's not much water there now because we are in a drought." Well, that is all fine. The drought will break and then we will be in a different situation, to the devastation that is going to end up happening if this whole process goes ahead with the dam to be raised. I would like to see a process where they really take it on board properly to take notice of the other proposals people put in rather than just raise the dam. From what I have seen there have been a lot of proposals put forward to do it in a different way so that there will not be such an impact on our culture. It needs to be seriously looked at rather than what is proposed at the moment.

The Hon. NATASHA MACLAREN-JONES: Thank you.

The CHAIR: Thank you. On behalf of the Committee I would like to thank you all for making time this afternoon to appear. We will be moving on to our next panel of environmental organisations.

(The witnesses withdrew)

KEITH MUIR, Executive Director, Colong Foundation for Wilderness, affirmed and examined

ALIX GOODWIN, Chief Executive Officer, National Parks Association of NSW, affirmed and examined

ROGER LEMBIT, Principal Ecologist, Gingra Ecological Surveys, affirmed and examined

KIM DE GOVRIK, Former Kanangra-Boyd National Park Area Manager, sworn and examined

The CHAIR: I welcome our next group of witnesses. Do any of you wish to add anything about the capacity in which you appear?

Mr DE GOVRIK: I was previously area manager for the Kanangra area for 27 years with National Parks. I am now an organiser with the Public Service Association.

Mr LEMBIT: I am an independent ecologist based in Earlwood.

The CHAIR: Would anyone like to begin by making a short statement, if we could keep it to around two minutes?

Mr MUIR: The legislation that this committee hearing is examining will overturn legislation which prevents the damage which would arise from the raising of the Warragamba Dam wall. The legislation effectively removes National Parks protection and the parks would then be in name only. There would be no management plan for the area. The management through the objects and the management principles of the Act are removed, so damage could occur which is not compatible with the conservation of the natural and cultural heritage values. The Colong Foundation opposes this and asks these questions: Why is the proposal compatible with wilderness areas, the State conservation areas, the world heritage area and the wild river? Why are those pieces of legislation compatible with damage which is going to harm the natural and cultural values of this? We oppose the legislation and would like to see the legislation strengthened for wilderness areas, State conservation areas, wild rivers and threatened species habitat so that this development would not be approvable under it.

The CHAIR: Thank you.

Ms GOODWIN: Thank you, Chair. The National Parks Association obviously welcomes the opportunity to appear before the inquiry. We have clearly indicated our opposition to the bill and have called on the Government to withdraw it. The bill raises a number of serious issues, as outlined in our submission, including for those living on the Nepean-Hawkesbury flood plain. Raising the Warragamba Dam wall will have a significant impact on four protected areas within the Greater Blue Mountains world heritage area, which was listed in 2000, and a significant number of threatened species. We are firmly of the view that the legislation and the inquiry are proceeding with undue haste, effectively locking the community out of the opportunity to participate in decisions about this complex matter.

There is no reason for the legislation to be rushed through without due consideration. The environmental impact statement [EIS] will not be completed until next year and the decision to proceed with this legislation now pre-empts its outcome. Added to this, the Federal environment Minister has delegated environmental assessment of the project to WaterNSW, the project proponent, under the New South Wales-Commonwealth bilateral agreement on four matters of national environmental significance. This has all the hallmarks of a conflict of interest and demands a serious inquiry. We therefore call for a longer parliamentary inquiry responsible for examining and reporting on the range of serious issues raised by this bill and the proposed raising of the Warragamba Dam wall.

The CHAIR: Thank you.

Mr DE GOVRIK: Thank you. Firstly I appreciate the opportunity to present to the Committee. As an area manager for the area that will possibly be inundated—I was an area manager based at Oberon, the Kanangra area, managing 250,000 hectares of national park including a large section of the Warragamba special area—I seem to recall being involved in a similar issue about 20 years ago, which is now back on the table. I am now an organiser with the PSA. There has been a National Parks restructure. I left the department in April at Easter time this year, along with many other staff, including 30 area managers and 30 senior field supervisors, and we have also lost 100 rangers over the past few years. We are significantly undermanned now. I was a workplace delegate with the PSA since 1990, representing rangers in Nationals Parks. I am now working as an organiser with the PSA.

The members that I represent are extremely concerned with this proposal and with the legislation that will see part of the Greater Blue Mountains World Heritage Area inundated. I would like to acknowledge the fact

that there are three million visitors to the Blue Mountains National Park every year and across the State 30 million visitors to National Parks. The members I represent are also extremely concerned with the implications for the land, the wildlife, the flora and fauna, and obviously the cultural heritage of the area. But they are also concerned as to how they will continue to manage the land if this inundation occurs and it impacts on their operational management of the area.

I also want to say that I note the comments of Charles Mundine in terms of turf wars and the issues that arise with land ownership. There have been significant issues over the past 20 years I have had to deal with between Sydney Water and the National Parks and Wildlife Service which has impacted on how we manage those lands. I see this as perhaps, or possibly with this enabling legislation, to a return to two separate groups managing the land and the issues that will occur as a result of that. I just hope that my input today will guide the Committee and be of assistance to the Committee in this inquiry.

Mr LEMBIT: I thank the Chair and members of the Committee for allowing me to present to the Committee today. The first point I would make is relating to World Heritage. This is a World Heritage Area that is going to be affected should temporary inundation proceed. I understand that the area affected could be about 4,700 hectares of World Heritage Area. When this World Heritage Area was declared the Australian and the New South Wales governments committed to protect it. This is one of the largest single proposals by a State party to modify habitat in a World Heritage Area.

I was a member of the Expert Panel of Ecologists who assessed the eucalypt value for the World Heritage nomination process. At that stage we understood a fair amount about the eucalypts occurring within the World Heritage Area but since the nomination went in there has been new information. We have got new records of eucalypts within the World Heritage Area, including a eucalypt called seeana which occurs in the Burragorang Valley. There are potential for other yet unfound eucalypts within the valley and I am not convinced that the level of survey that has been conducted is sufficient to understand the full range of species which might be affected.

There is a range of impacts, one of which is inundation. I have been involved in various field observations of plant, water relations across the Blue Mountains for a very long period of time. I have got long-term monitoring sites at shrub swamps on the Newnes Plateau which have been running since 1991. I was also involved in the then Water Board proposals to send water down the Wingecarribee River from Wingecarribee Reservoir into Lake Burragorang back in 1988 and researched potential impacts of the inundation relating to those proposals. In 1989, working on the earlier proposal to raise the dam, I found a new population of Hakea dohertyi, a very rare Hakea on the Tonali River arm of the lake within the inundation zone. Hakea dohertyi is a member of the Proteacae family. Those plants have a special root structure which allows them to absorb phosphorous from our very low phosphorous soils.

I have been monitoring the riparian vegetation along Waratah Rivulet which has been subject to coalmining. I have been monitoring that area since 2001. There is another Proteacae plant that grows in the riparian zone, that is Lomatia myricoides. As a result of the dramatic changes in the water levels along Waratah Rivulet there was significant death of that Lomatia. So it has now been recognised as an indicator plant of changes to water levels as a result of the work I did along there.

Another issue in terms of impact is weed invasion. Recent studies have shown even very low periods of inundation can lead to significant weed invasion. I was walking the Kowmung River on the weekend and there were a lot more weeds in parts of the river than I observed 40 years ago when I first walked the river. So there are weeds like moth vine, blackberries, introduced passionfruit which are expanding their range across the river system. The other issue in relation to when there is a large extra inundation area is erosion. So you have got the issue of wave action at a much higher level in the environment than previously existed. That is another issue that needs to be considered.

The Hon. PENNY SHARPE: Ms Goodwin, will you take the Committee through the delegation process? I am interested in your comments that there is supposed to be Federal oversight of this very important place. It has been delegated to Water NSW who is the proponent of this project. Will you expand on that? I am surprised that if you were going to delegate to someone that you did not perhaps delegate to the Office of Environment and Heritage rather than Water NSW for this project. Will you take the Committee through that.

Ms GOODWIN: Yes, I can briefly reference my understanding of it, and I am happy for my colleagues who have more experience in this matter to add to it. The Greater Blue Mountains World Heritage Area has a number of matters of national environmental significance. That includes the fact that it is World Heritage listed. It has threatened species and communities. It is National Heritage listed and it has got listed migrated birds. As a consequence, it falls within the jurisdiction of the Environmental Protection and Biodiversity Conservation Act at

the Federal level. This requires a proponent to, I guess, make a referral to the Commonwealth to determine whether an assessment is necessary under that legislation and who should carry that out, as I understand it. A bilateral agreement between the two jurisdictions, between the Commonwealth and the State, enables the Federal Minister responsible to delegate that to the State.

The Hon. PENNY SHARPE: They have to delegate to the proponent of the project? They would decide whether they need to delegate it and it would have had to go to Water NSW?

Ms GOODWIN: I cannot speak to that specifically. One of my colleagues may have more information on that. Can you speak to that?

Mr MUIR: Firstly, I refer to the operational guidelines of the World Heritage Convention which regulate management of areas that are World Heritage listed. Through those guidelines it is specified how you should protect and manage a World Heritage Area and how you should define boundaries. Clearly this legislation is not compliant with the provisions of the operational guidelines.

The Hon. PENNY SHARPE: Can I stop you there? Do you believe that this proposal is endangering the World Heritage listing of the Blue Mountains National Park?

Mr MUIR: That is a matter for the World Heritage Committee to determine. It may receive a recommendation that it is. I would believe that it is, because its management in the management plan under this proposed legislation contains no provisions at all. There is no objects, there is no management principles, there is no provisions to attempt to mitigate or address the potential environmental impacts. Indeed, there is no definition of the area to be impacted because it does not define what the temporary inundation shall be. In regard to the delegation, it is delegated to the Minister responsible, which I believe is Stuart Ayres. The assessment authority would be the New South Wales Department of Planning and Environment, I believe. But determination would be by the Federal Minister and the State Minister of this matter. At this stage, I think that is the current arrangement in regard to the delegation.

The Hon. PENNY SHARPE: And the role of the State environment Minister in this?

Mr MUIR: Under the National Parks and Wildlife Act I believe that it is the landowner, at the current time it is the landowner, and still would be the landowner. They would have a concurrence role in regard to the proposal.

The Hon. PENNY SHARPE: I think in the legislation they are suggesting a concurrence.

Mr MUIR: The bill, though, is silent on that matter. It is unclear to me whether that would still operate. It is still, I suppose, national park so it would. But the management principles and the objects of the National Parks and Wildlife Act no longer operate. The National Parks and Wildlife Act no longer operates, but the owner of the land is still the Minister for the Environment as it is still a national park. So I am a little bit unclear as to how it would operate. Perhaps that is something for a future inquiry to identify what is going on there.

The Hon. PENNY SHARPE: Mr Lembit, could you talk the Committee through the impact of inundation on flora and fauna? We talk about it in the abstract and there is some argument about whether the temporary inundation will be two weeks or whether it will be longer than that. What fundamentally will it do to those areas that are going to be inundated and how long will it take them to recover? Are they able to recover once this has occurred?

Mr LEMBIT: There are a different range of impacts depending on the period of inundation. Some plants respond more quickly than others. Some plants might die or start having some sort of evidence of disease very quickly whereas others will take a lot longer. The science of understanding inundation impacts is still continuing, but essentially what happens is that the water saturates the soil and therefore the plants cannot absorb oxygen through their roots. Unless plants have adaptations to allow them to do so, such as aquatic plants or plants that live very close to the edge of a riparian zone, then they may be susceptible to periods of inundation. Because different plants will respond differently it is a bit hard to say across the board what is going to happen, but it is likely that there will be changes to the vegetation structure because some plants will be disadvantaged by even relatively short periods of inundation whereas others will be able to persist.

Already around the edge of the lake there have been changes because of the fact that the lake is there. If you go to the lookouts in the Blue Mountains in the early to late autumn period when there is often fogs in the valley you see the valley is filled with fog. That is humidity that arises because of the fact that the lake is there and it is in a more humid environment. You have got plant species such as rainforest species which have, in a

sense, invaded the woodlands because of the increased levels of humidity. You have got dry rainforest species which have expanded since the lake was first put in there.

The Hon. PENNY SHARPE: They would be crowding out habitat for regent honeyeaters, for example?

Mr LEMBIT: Yes, because that requires a more grassy woodland habitat rather than a rainforest habitat. You have also got river oaks, which are a riparian species. They only really grow very close to the rivers. You have now got them on the edge of the lake, and they would not have been there before. And you have got the issue of the weed load. The Coxs River is particularly a problem because you have got things like environmental weeds which have arisen from the townships like Lithgow but also things that were planted around Jenolan Caves. I worked on the Jenolan Caves plan of management back in 1990. There is a very large number of weeds around the Jenolan Caves, some of which were introduced as garden plants. One of them is a plant called tutsan, hypericum androsaemum, and it has spread kilometres from Jenolan Caves down to the edge of the stored water just in the time since Jenolan was developed.

The Hon. PENNY SHARPE: Essentially, inundation then accelerates that?

Mr LEMBIT: And because of the recent science that shows that weeds can adapt quite quickly to those changes and they are able to take advantage of fairly relatively short periods of change in inundation. Even a short period of three days might create conditions which means that the areas have a higher propensity for weed invasion and you have got a very big existing weed load running right down those rivers at the moment.

The Hon. PENNY SHARPE: Mr De Govrik, in your experience, as this process has been going forward what role would the National Parks and Wildlife Service have in providing feedback on the impact of this proposal?

Mr DE GOVRIK: I cannot speak on behalf of the whole organisation but I was managing—

The Hon. PENNY SHARPE: When you were doing it, what would normally have happened?

Mr DE GOVRIK: When I was the area manager at Kanangra, which was up until recently, I only heard second-hand about the proposal. I certainly was never consulted on the proposal even though I was managing a significant proportion of the land that was going to be affected. No, it was very—I could use the words—cloak and dagger. It was never something that was placed at the forefront of my radar and I was never asked to comment on or discuss anything about the proposal.

The Hon. PENNY SHARPE: You all alluded to 20 years ago having exactly the same issue. What has changed in that time? Are the arguments basically exactly the same as they were 20 years ago, or is there anything else we need to take into account?

Mr DE GOVRIK: I think what has always been at the forefront of my mind as not just a manager of national parks but a manager of catchment lands—when we had the cryptosporidium scare in I think it was the late 1990s, I felt responsible in part for managing the water quality for four million people in Sydney. I took that very seriously. To the best of my ability, I tried to manage vertebrate pests or other threatening processes on the water quality of that area. We are talking about four million people. We are now also concerned about the impact on a potential I think 134,000 people living on the flood plain area on the Hawkesbury River. I think I know what I would be more concerned about. I would be concerned about having to go to the people of Sydney and say that you are going to have to boil your water again because we have some issues with the water quality of Lake Burragorang. That is what I would be concerned about.

The Hon. PENNY SHARPE: In relation to the wilderness areas, there are different levels of protection for different sorts of land. Given this is specifically in a wilderness area right on our doorstep, what protections are being lost through this bill?

Mr MUIR: This is one of the questions I have in relation to the legislation as it applies to the National Parks and Wildlife Act and the operation of that. It removes that and there is a subclause that says that the temporary inundation of the park, the section regulating that, has effect regardless of—or "despite" is the word—any provision in the National Parks and Wildlife Act. All the objects and management principles that are enunciated in section 30E of the Act do not operate, so there is nothing.

You could, for example, build a road if it was in the temporary inundation area. You could just say, "The roads that are existing now are damaged because they are too low in relation to the flood inundation exercise." There is nothing stopping Water NSW just going in and making new roads. That, of course, is something for a further inquiry. It is a very cavalier, if I may say so, piece of legislation—moving national parks, not regarding what it will do to other legislation, to a world heritage area, to wilderness—wildness areas that incidentally this

Government has expanded in the case of Nattai. The legislation that this legislation is repealing was in fact given bipartisan support back in 2001.

The Hon. PENNY SHARPE: Was it put in place because of the world heritage listing. Was it about further protection of that land?

Mr MUIR: That is right. The intention was to strengthen the protection of the Greater Blue Mountains World Heritage Area in the fervour that followed, so the Blue Mountains National Park, in particular, was expanded and new legislation was made to enable that to occur. That happened and that was done in a bipartisan manner. There has been an awful lot of work done over the last 80 or so years to protect this area over generations in a bipartisan manner and that has been the direction of management and suddenly this legislation comes along and it is just wiping that away.

That direction for bipartisan support for the protection of this area, it is not just a small area; it is core areas. It affects the Kowmung River and the Coxs River, the very heartlands of the southern Blue Mountains. It is something that needs to be done not in a cavalier manner but in a very careful and considered way. A rushed inquiry like this—excuse me, Mr Chair—but it is a rushed inquiry with a very short time frame of less than a week. You are not going to get to the bottom of everything in this hearing and I do not even know; I understand the second reading speeches have all been done. How are the parliamentarians going to frame their speeches if they do not know what the issues are?

The CHAIR: Thank you. We will go to the crossbench with Mr Field from The Greens.

Mr JUSTIN FIELD: I thank everyone for being here. The Government has made very clear that this is a temporary inundation. We heard earlier about the impact that even a temporary inundation would have on cultural heritage. Can I get a sense from you of how significant you think the ecological consequences of even a temporary inundation would be? I understand, Mr Lembit, you have already provided some evidence around that but, on a scale of 1 to 10, is it insignificant or extreme?

Mr LEMBIT: It is of such a level that it puts the status of world heritage at risk. The inundation might be temporary but the effects are permanent.

Mr JUSTIN FIELD: Would others concur with that position?

Mr DE GOVRIK: Yes.

Ms GOODWIN: I think one example—and perhaps others can add to this—is the regent honeyeater, which is critically endangered. It is a nomadic species. It travels across three areas within and abutting the Greater Blue Mountains World Heritage Area and my understanding is that if this proposal proceeds, then in fact its breeding ground could be dramatically impacted and it may in fact drive the species regionally to extinction. It certainly makes a mockery of 24 years of work undertaken the Regent Honeyeater Recovery Program in the Capertee Valley to which government has contributed resources and volunteers and private landholders many, many hours of work over that period of time. What was the purpose of that investment?

Mr JUSTIN FIELD: WaterNSW's role under this bill is pretty significant. It essentially has veto power over the development of an environmental management plan [EMP] and I get the sense that it may well have been delegated the consideration of matters of national environmental significance. Does it have the ecological skills to be able to actually undertake those assessments or meaningfully advise the Minister when it comes to the development of an EMP?

Mr DE GOVRIK: I have real concerns about their involvement in this process but I do not want to get into a discussion over how the relationship between National Parks and Sydney Water has been over the last 20 years. To call it acrimonious would be to say the least. We are now at a situation with our service level agreement, which is a funding agreement between National Parks and Sydney Water, where they are not funding it this financial year—$4 million to $6 million of land management programs designed to protect the catchment lands, enhance water quality, are out the door. They are still not wanting to fund land management programs in the Warragamba Special Area and now I know why. I see it; there is a turf war, like Charles Mundine alluded to. It is a turf war where they want their land back that was transferred in 2002. They are not going to fund it because they want to be the land manager and they want to retain the funds. I find it unbelievable.

Mr JUSTIN FIELD: So how would the development of an environmental management plan, particularly considering the water Minister would have veto power over the contents of it, compare to the plan of management requirements under the National Parks and Wildlife Act? Would they be comparable? Have we seen this operate before?

Mr MUIR: Mr Field, this is a hypothetical question because there are no provisions in the bill that would cover the objects that are in section 30E of the National Parks and Wildlife Act so that the heritage is managed and protected. They have a responsibility to protect the water quality so they might focus on those sorts of things. They may wish to cover the whole area that gets disturbed with some sort of exotic grass, for all I know, to meet that objective but their motivations are different from the duties given to the National Parks and Wildlife Service, which are much broader but they also include catchment protection. This is the beauty of the scheme; that you had the National Parks looking after the inner catchment and the outer catchments were managed by catchment managers and there was a separation between the two authorities.

That was the approach taken and indeed I think it has bipartisan support, and now we are going back to another way of doing things. I do not think that the framers—that has not been really thought through. Again, I support the idea of a broader inquiry to get to the bottom of it because you do not want to have two management agencies looking after the same or adjoining bits of land and having arguments over who is responsible for what and arguing over where the roads go, how they are maintained and all the rest of it. Those are bread and butter issues but that is a consequence of this legislation. It is starting to cook up a problem that should have been solved and had been solved and was settling down. Now it has flared up again and we are hearing from my colleague Mr De Govrik that they are not funding. What on earth has future legislation got to do with current funding? I mean, someone should make some inquiries about that too.

Ms GOODWIN: If I can just add to Mr Muir's comments. The bill as it stands at the moment certainly sets a lower bar in terms of transparency for the development of any plan of management because it does not require community consultation and it does not go through any advisory processes. If we were operating under the National Parks and Wildlife Act we would have two tiers of review and public consultation, public consultation which has legislatively prescribed time frames and involves community and experts from a regional and then a State perspective assessing and reviewing and commenting on the resulting plan.

If I can just comment on the point about resources not being made available for the management of the water catchment. Referencing back to the cryptosporidium review, the McClellan review also recommended the transfer of management responsibility of the water catchments, of the special areas to the National Parks and Wildlife Service. It recommended the resourcing of the National Parks and Wildlife Service by the water authority to undertake that work.

Mr JUSTIN FIELD: I appreciate that reference; I think that is very relevant. If this bill is allowed to pass and the project approved, should that land that would be even temporarily inundated in the future and lost in terms of ecological value, be required to be offset in some way, shape or form? Can it be offset?

Mr LEMBIT: In terms of some of the vegetation communities, they are unique, so those cannot be directly offset like for like. Under the Biodiversity Conservation Act there are requirements for offsetting, and presumably this project needs to comply with the normal requirements under the Biodiversity Conservation Act and the Environmental Planning and Assessment Act. That would mean that they would have to use the biodiversity assessment method which is provided for under that legislation, and that would require offsets consistent with the requirements of those Acts.

Mr MUIR: Can I just add to that. There are no compensation provisions under this legislation for the wilderness areas, for the World Heritage area, for the national park. There may be for biodiversity, but that has not been considered, and there is no licence, lease, tenure arrangement, which usually frames those sorts of arrangements. There is nothing like that; it is the opposite—no operation of any regulated allocation of right to WaterNSW, it is just they have control and there will be no allocation and, it seems to me, that there is no intention of compensation for the national park or anything else. By the way, of course, you cannot replace the southern Blue Mountains—if you damage it, it is gone.

The Hon. RICK COLLESS: Thank you all for coming in this afternoon. Mr Muir, can I start with you. You used the term "cavalier manner" in which this inquiry was being conducted.

Mr MUIR: No. The cavalier manner is referring to the legislation. I did not imply any suggestion that this was not a proper inquiry. It is a hurried inquiry, you would agree with that, would you not?

The Hon. RICK COLLESS: Cavalier manner in which the legislation was prepared, that was your point.

Mr MUIR: Yes.

The Hon. RICK COLLESS: You would be aware though, this legislation is to allow the full investigation process to proceed; it is not seeking approval to raise the dam wall.

Mr MUIR: My point, and I think it has been pretty clearly elucidated by the discussions that we have had—we have identified a number of issues which have not really been properly considered in the legislation; that is, in regard to the management plan. It is just an empty box—they are the words I use in my submission; it has not got any provisions. We have identified an overlap between two government agencies, which has not been considered. We have considered the management provisions for a World Heritage area and for a national park and what happens there, and their removal, and that it has been contrary to bipartisan support for these in the past. That is the evidence upon which I frame that remark.

The Hon. RICK COLLESS: But my point is that this legislation is to allow for those assessments to proceed.

Mr MUIR: Assessment is one thing, but the legislation does what it does.

Mr JUSTIN FIELD: Point of order: Minister Ayres himself, and I believe in response in the Legislative Council, made clear this legislation does not prevent the EIS process being undertaken.

The Hon. NATASHA MACLAREN-JONES: That is not a point of order.

Mr JUSTIN FIELD: Mr Colless has made this comment now to two sets of witnesses. It is incorrect and he is trying—

The Hon. NATASHA MACLAREN-JONES: No, it is not.

Mr JUSTIN FIELD: Your own Minister has made that case.

The Hon. NATASHA MACLAREN-JONES: We have the department appearing this afternoon and you can seek clarification.

The Hon. JOHN GRAHAM: To the point of order: I appreciate the point my colleague is making and I would support the point of the order to the extent that this is outside the scope of the bill, the suggestion that this relates to the EIS. Our colleague is straying outside the scope of this bill.

The CHAIR: There is no point of order.

The Hon. RICK COLLESS: I was just about to quote from the Minister's second reading speech where he points out that "The bill includes built-in environmental safeguards by way of requiring an environmental management plan to be approved by the Minister administering the National Parks and Wildlife Act 1974 in concurrence with the Minister administering the Water NSW Act 2014." He goes on to say, "The bill specifies that the environmental management plan will need to address all matters specified by the Minister administering the National Parks and Wildlife Act 1974." The point I am making is that this bill that we are discussing today allows all those investigations to proceed and outlines in the second reading speech those issues that must be addressed, which you are concerned about, and I appreciate your concern.

Mr MUIR: The legislation does not specify anything in terms of content. The Minister may wish to make specifications at a later date and he may do so, but as far as what is there now, it is defined by section 30E in the National Parks and Wildlife Act—it is very precise and clear—and there are provisions in the Wilderness Act and so on. So these things are being replaced by something that is a hypothetical into the future and I do not believe that the process that has been set in place is equal to it or adequate.

The Hon. RICK COLLESS: Thank you for that. I cannot agree with you but I take your point nonetheless. I move on to Mr Lembit. You spoke about the 4,600 hectares, and this figure has been mentioned a few times. Can you tell me what proportion of that World Heritage area that is?

Mr LEMBIT: I have not done the figures on that, so no. I have seen different figures. As I indicated in a letter to the *Sydney Morning Herald*: Which part of the Mona Lisa would you rub out?

The Hon. RICK COLLESS: What is the total area of that World Heritage area?

Mr LEMBIT: I have not got the figures in front of me.

The Hon. RICK COLLESS: You talked about inundation preventing plants from absorbing oxygen through their roots.

Mr LEMBIT: Yes.

The Hon. RICK COLLESS: How much oxygen do plants absorb through their roots?

Mr LEMBIT: Different plants would absorb more or less, but that is certainly an issue in terms of plant physiology.

The Hon. RICK COLLESS: Do not plants absorb their oxygen through their leaves?

Mr LEMBIT: To some extent, yes, but also through the roots. They absorb nutrients through the roots, and water. But the level of oxygen in the soil is important in terms of plant physiology and absorption, so yes.

The Hon. RICK COLLESS: You mentioned around the edge of the lake you see changes as a result of that inundation occurring. Around the edges of the existing lake that is an area of permanent inundation?

Mr LEMBIT: Yes.

The Hon. RICK COLLESS: You would expect to see more changes there than you might on an area that is inundated once every 500 years?

Mr LEMBIT: Certainly. Or even areas that are inundated every five years or so, yes.

The Hon. RICK COLLESS: You mentioned the fogs in the Burragorang Valley. Did fogs occur prior to the construction of the Burragorang Dam?

Mr LEMBIT: They certainly did. There are studies around the world that show that these large water bodies increase the frequency of fogs. That is a well-known phenomenon.

The Hon. RICK COLLESS: Mr De Govrik, you mentioned that you would be concerned about having to tell the people of Sydney that they could be in for a cryptosporidium outbreak because of the water quality in the dam.

Mr DE GOVRIK: I did not say cryptosporidium; I said an issue with water quality.

The Hon. RICK COLLESS: Sorry. What would be of more concern to you: the possibility of a water quality issue in Lake Burragorang or telling the people of the lower Hawkesbury Valley that it is estimated that a flood level of 19 metres was about to hit Windsor?

Mr DE GOVRIK: I have read some of the other input into this Committee. They could look at alternative options to mitigating flood issues on the Hawkesbury plain other than the proposal to raise the dam wall by 14 metres. The Carr Government put the spillway in to attempt to regulate water flow. I was there during the construction of that and since then and I know we have been in a dry period but I do not know if that has been thoroughly tested as to how it will control flows. There are alternative options that need to be considered. I am no expert on floods but I can certainly say if there are other options that can be considered in terms of flood mitigation they should be considered.

The Hon. RICK COLLESS: I put it to you that they have been examined in some detail in the document titled "Resilient valley, resilient communities: The Hawkesbury-Nepean flood risk management strategy" that was completed in January 2017. They went through a range of different issues, including leaving airspace in the current dam which would reduce the capacity of the dam by 800,000 megalitres, a significant amount of water in a water supply dam. What is your preferred option? Do you have any other preferred option?

Mr DE GOVRIK: I do not have the advantage of all the information being in front of me for those options.

The Hon. PENNY SHARPE: Nor do we.

The Hon. RICK COLLESS: It is available; you could have read it.

The Hon. PENNY SHARPE: I have read that report and as you would know the sources of the report are not contained or cited or been able to be provided. If you want to go into that I am happy to.

The Hon. RICK COLLESS: Mr De Govrik, if you cannot make a comment on that I might ask the other members of the panel what their preferred options are.

Mr MUIR: I do observe that report which you refer to says also that there will be another 134,000 people on the flood plain in 30 years, yet apparently this is not about development. That seems to me a lot of development. It also seems that if this is to occur then you are in consequence putting more people at risk, perhaps not in the same frequency as we have now, but more people at risk and you end up with a nil sum gain by raising the dam and allowing the urban development to go on the flood plain. I do not think this is an appropriate approach. There are developments that are held up now because it is said to not be proceeding because there is not this dam. I think that is totally appropriate.

I think flood plains are supposed to be for floods, that is the appropriate use of a flood plain. Trying to engineer another outcome out of a flood plain is always going to have inherent risk. I would urge the Committee to think about the future of those people, those future residents, if you approve it and everybody has a false sense of security with a raised dam. And what will happen if there is no massive investment in escape routes into the future. You will have more people on the flood plain, probably not enough escape routes, and what will the Committee members do when they are dragged before a royal commission?

The Hon. RICK COLLESS: There is no proposal to increase the flood level, that is not going to change for building purposes. There is 134,000 people currently living on the flood plain, there is no proposal to increase it by 134,000.

Mr MUIR: Yes, there is.

The Hon. PENNY SHARPE: Yes, there is: Penrith Lakes.

Mr JUSTIN FIELD: It is in the report.

The Hon. RICK COLLESS: That is the misinformation that is out there.

Mr MUIR: It is in your report; I will table it as evidence.

The Hon. NATASHA MACLAREN-JONES: Mr Muir, following on from my colleagues questions, you said the flood plain should be treated as a flood plain. My question, is it not the role of government to ensure the safety of the community and residents now and into the future should also be guaranteed? It is their responsibility to put in place the processes to ensure that is the case rather than allowing peoples' homes and businesses to be destroyed.

Mr MUIR: Again, there is reference in the report that makes clear statements about further urban development on the flood plain. It is not appropriate to build on the flood plain.

The Hon. NATASHA MACLAREN-JONES: I am talking about currently. If there is a natural disaster, whether a flood or a fire, under your scenario our Government should sit back and allow that to occur, to destroy peoples' homes?

Mr MUIR: That is not the case. Flood escape routes have been built. You can actually remove the lowest of the most at risk properties and flood insurance is a solution but to put more people on the flood plain is not a solution regardless of whether you raise the dam or not. As I understand it, it is clearly the case that there is an intention to build on the flood plain for 134,000 people.

The Hon. PENNY SHARPE: Page three of the report you are quoting from.

The Hon. NATASHA MACLAREN-JONES: I am interested in the current homes and businesses that may be affected if there was a natural disaster.

Mr DE GOVRIK: The spillway in place now that was built, over the last 20 years, I thought that was supposed to mitigate issues with flooding on the Hawkesbury plain.

The Hon. NATASHA MACLAREN-JONES: Evidence from the insurance council and emergency services indicates that they feel that the current situation is not adequate to support a clear evacuation of everybody.

Mr MUIR: I am glad you asked this because the dam only addresses one point of flooding, there are many other streams that will flood into the future and they are not addressed by this proposal. It is only a half solution. You have all the Nepean upstream of the dam, you have the Gross, you have the Colo and the Macdonald rivers. All those rivers and South Creek are unregulated to a large extent. You are not achieving any mitigation of those streams, only the Warragamba River. My understanding is you would have received a report from Professor Jamie Piggot in relation to this and you would find that about 45 per cent of the catchment is not regulated by this proposal and you will still have major floods, the large ones, not regulated. If you allow the urban development, which is in the reports you have quoted, then those people will be at risk. If you allow the Penrith Lakes development, 8,000 houses, that will be people at risk.

Mr LEMBIT: In relation to that other part of the catchment too, I have been involved in assessing urban development for instance in the south west sector and involved in the South Creek flood plain management strategy a long time ago. You have a significant amount of urban development in that other part of the catchment, which is changing the runoff characteristics into that. You have got significant issues affecting other parts of the

catchment which virtually nothing is being done about in terms of considering those impacts on floods down the river system.

The Hon. NATASHA MACLAREN-JONES: But you do not have any solution?

Mr JUSTIN FIELD: Point of order: The witnesses here put forward detailed submissions about environmental consequences. I am not sure it is reasonable to push so much to ask for alternatives. We will hear evidence from others about that.

The CHAIR: You have been saved by the bell, Mr Field. I thank the witnesses for their time this afternoon.

The Hon. NATASHA MACLAREN-JONES: If they are experts they would have an opinion.

Mr JUSTIN FIELD: They have an opinion about ecology.

The Hon. NATASHA MACLAREN-JONES: But no solutions.

(The witnesses withdrew)

MARGARET MOUSSA, Lecturer in Economics, School of Business, Western Sydney University, affirmed and examined

STUART KHAN, Professor, School of Civil and Environmental Engineering, University of New South Wales, affirmed and examined

BOB DEBUS, former Minister for the Environment, and Minister for Emergency Services, affirmed and examined

ROSS CRATES, Postdoctoral Researcher, Fenner School of Environment and Society, Australian National University, affirmed and examined

The CHAIR: Would anyone like to begin by making a short opening statement? Please keep it to two minutes.

Dr MOUSSA: I will try to keep it two minutes. I am basically speaking to my submission, and that is looking at the cost benefit analysis [CBA] of the five shortlisted Hawkesbury-Nepean Valley flood mitigation infrastructure options. For unspecified reasons this CBA is not available to the public, and I understand that you have not read it either. That really limits what we can do. My submission is therefore a methodological analysis of Infrastructure NSW's 2017 summary of the CBA, Resilient Valley, Resilient Communities, as well as antecedent Molino Stewart research commissioned by the New South Wales Government Department of Primary Industries, and Infrastructure NSW.

Very briefly, and I will keep it brief—although that is difficult when you are discussing methodology—there appear to be three fundamental problems with this CBA. The first is that while the official terms of reference are suitably narrow and focused, the scope of the actual analysis appears to be much more broad, so broad as to effectively increase the proportion of what we call unknowns or uncertainties, and thus that erodes the credibility of the conclusions. I will not go into detail, but specifically a key scenario in the CBA posits as its context the transformation, from Resilient Valley, Resilient Communities, "a semi-rural landscape to an urban flood plain" within a relatively short period and a relatively confined region.

This is described by Infrastructure NSW as a major development involving a population increase of 89,000 people, 39,000 new homes and 37,000 additional jobs. An event of this scale is likely to have widespread, complex, cumulative effects. Such factors as the location of service facilities, major regional road construction, local council regulations and property values are likely to be affected. But the point is, we cannot specify exactly how because of the scale of the change. All these in the CBA, judging by the 2017 document, are effectively held constant, apart from discounting. This substantially compromises the quantification of the flood risks and mitigation benefits.

Very briefly, the second major problem is there appears to be an inconsistency in the methodology applied to identifying the costs and benefits of infrastructure option one, raising the crest of the Warragamba Dam wall, and the methods applied when assessing the other infrastructure options. This inconsistency relates to the treatment of intangibles, specifically environmental impacts. This marked inconsistency gives the impression of a pre-analysis bias towards option one, raising the crest of the Warragamba Dam wall.

I will do the third one very briefly because it is complicated. It is referring to someone else's research. The CBA also appears to—I keep saying "appears to" because we cannot actually get it—lack credibility because it appears not to have considered the full range of infrastructure options. Most notably, it appears to have overlooked the Hawkesbury-Nepean Valley flood mitigation and drought mitigation analysis published by a team of Australian engineers, economists and environmental scientists from Griffith University, University of Technology Sydney [UTS], and Deakin University. This exacerbates the impression of a pre-analysis bias towards option one. Thank you for giving me the opportunity to say this.

The CHAIR: Professor Khan, would you like to make an opening statement?

Professor KHAN: Yes. Thank you for the opportunity. There are two areas I would like to speak to, which are the two areas that I covered in my submission. The first of those relates to water quality and risks associated with water quality and public health. As you know the State Environmental Planning Policy (Sydney Water Drinking Catchment) 2011 has a provision in it which requires that developments that occur in the catchment must take into account the neutral or beneficial test in terms of potential impacts to water quality. I think it is clear that raising the dam wall is a development within the catchment. I think that water quality will be a very big issue and it will be a difficult issue to understand, but the risks are very high. I have recently

completed a couple of major research projects, one of them was an international research project looking at water quality impacts of extreme weather events. That is something that I can speak to more perhaps during the next hour, but there are some very significant water quality risks associated with inundating a large area of flood plain which is not traditionally inundated. I think that they need to be seriously considered in part of the overall costs and benefits of the proposal.

The other area that I would like to speak to today is to do with water supply diversification and thinking about where Sydney's drinking water comes from. Other projects that I have been involved in—and very closely related to incidents and extreme weather events—have shown how flexibility and diversification is a very valuable and very important component of an overall water supply to a city. At the moment the way that Sydney is set up, one of the big well-recognised vulnerabilities—perhaps not well talked about—is that all pipes lead to Prospect. We have this very centralised system whereby, if we do have an incident in the system like that, there is very little that you can do.

There is very little flexibility to be able to work around that whereas if you look at other areas—south-east Queensland is a good example where they have got the water grid, et cetera. In Queensland—they are able to deal with incidents by managing that. The reason I think that is relevant comes back to some of the alternative scenarios that have been proposed where we might rely more on alternative drinking water supplies, such as desalination plants, potable water recycling, et cetera, and other ways to enhance water supply security for Sydney, thus relieving some of the requirements that we currently put on Warragamba Dam as our biggest water storage and potentially opening up space in that reservoir for flood mitigation capacity.

Mr DEBUS: I am a bit of a fish out of water here, if I might say so. Everybody else has significant scientific expertise and I will speak of the politics. I do so in the knowledge that it is not altogether usual for former Ministers to turn up and try to defend something that happened 20 years ago at some type of meeting like this in the Parliament, but I do so in the context of what I regard as being a total crisis of environmental policy in this jurisdiction at the moment. We have seen a world-class catchment management system dismantled. We have seen the subversion of the Murray-Darling Basin plan. We have seen the degradation of the National Parks and Wildlife Service, which was once regarded as one of the five outstanding such services in the world. We have seen the arrangements for the protection of native vegetation undermined. Now we see a proposal in which the Government is proceeding in apparent ignorance of the national and international significance of the World Heritage status of the Blue Mountains National Park.

This exercise reminds me somewhat of the recent decisions around the Kosciuszko National Park in which, on the basis of no coherent evidence whatsoever, arrangements are being made to turn the Kosciuszko National Park into a horse farm. The prospectus for the proposal to raise the Warragamba Dam begins within its first couple of paragraphs with an assumption that ought to be the question. It begins with an assumption that a certain number of people—135,000, I think it is—will be moved onto the flood plain in the next several decades. It does not consider a possibility reinforced by every expert I have been able to speak to, not least of whom is Professor Pittock from the Australian National University [ANU], whose paper I recommend to you, at the very moment when around the world people are thinking about getting people off flood plains, not onto them. I do not pretend to be able to particularly support the detailed arguments that have been made by expert people, but Professor Pittock's paper makes the general argument, and alternative proposals by Professor Pittock suggest, that this plan will not work.

It is said to be necessary to raise the Warragamba Dam wall to stop deaths in the valley, and yet experts who are not working for the Government or conflicted out by arrangements with the Government almost universally say it will not work. The whole inquiry is closed and this legislation is meant to close it even further. I would end this dissertation by just saying this: Whatever else is true, it is just outrageous that this process is not open to public consultation and that it is not open to sensible scientific advice and peer review. I find it simply outrageous that it can proceed without those characteristics.

Mr CRATES: Thank you very much to the Committee for inviting me here today to give evidence. I would first like to disclose that in 2017 I was contracted by SMEC to undertake regent honeyeater surveys in the Warragamba Dam as part of the assessment process. Having signed a disclosure agreement, I am not at liberty to disclose specific details of the results of those surveys. Therefore, the data and evidence I am providing here today reflects my own data, data that I have been given permission to disclose, data that has already been disclosed, and data from other parties. The regent honeyeater has very specific habitat requirements. Their preferred food tree species when nesting typically grow on the lower slopes and fertile plains of river valleys. Because those areas have been disproportionately cleared, severe habitat loss is the main driver of population decline in the regent honeyeater.

Given their vast range, small population size and nomadic movement patterns, it is very difficult to study the regent honeyeater. Our best estimate is that between 200 and 500 individuals remain in the wild and therefore the population is listed as critically endangered under Federal biodiversity legislation. Our group at the ANU commenced research on regent honeyeaters in 2015. Over two and a half years we searched for potential breeding habitats from northern Victoria to southern Queensland. We have now established more than 900 monitoring sites throughout these species' range, which we survey at least twice every breeding season. Standardised sampling has enabled us to locate breeding birds to better understand the threats facing the species.

The first standardised survey effort in the Burragorang Valley commenced last year. We found a minimum of 21 adult birds, two juveniles and seven nests, which represents 5 per cent to 10 per cent of the estimated global population and 15 per cent of all adult birds located throughout the range in 2017. The Burragorang breeding aggregation is the second-largest of only four breeding aggregations located last year. This year, one of only five birds located throughout the range, due to the drought, was found in the Burragorang. This male was singing from a river oak within the proposed inundation area.

Given my experience of the habitats within the Burragorang Valley and throughout the species range, it is my opinion that the raising of the Warragamba Dam will lead to the loss of the vast majority of breeding regent honeyeater habitat within the Burragorang Valley. Key vegetation communities inundated would include yellow box, red gum, rough barked-apple, grassy woodland and tens of kilometres of river oak forest. Regent honeyeaters are well known to nest in all of these vegetation communities. It is my opinion that raising the Warragamba Dam fulfils at least six of the nine criteria for defining significant impacts under the Environment Protection and Biodiversity Conservation [EPBC] Act. The available evidence suggests that that dam raising will seriously jeopardise the persistence of the wild regent honeyeater population and is likely to contribute to the extinction of the species in the wild.

Loss of regent honeyeater habitat is very unlikely to be able to be offset by protecting alternative habitat elsewhere because regent honeyeater breeding habitat no longer exists on a comparable scale in other areas. The bill also will undermine millions of dollars of conservation investment to develop a regent honeyeater captive breeding program and decades of investment in habitat restoration and conservation action elsewhere. Finally I would like to say that it also sets a dangerous precedent for future biodiversity conservation issues arising as a result of State significant infrastructure proposals.

The Hon. JOHN GRAHAM: Thank you all for your evidence. Mr Crates, thank you for your evidence and for your declaration of interest at the start of that. I take it from those comments that you also have received in the last 24 hours guidance in writing as to what you are and are not allowed to tell this Committee. Is that correct?

Mr CRATES: I have not received guidance in writing of what I am allowed to disclose. Therefore, I will not disclose anything that has not already been disclosed to the public.

The Hon. JOHN GRAHAM: Mr Debus, I might come to you. Thank you for your evidence this today. This certainly is not the first time this proposal has come up. We have already had discussion in evidence earlier that 20 years ago this was under discussion. It has come up multiple times and been rejected by previous governments. You have seen that discussion as a local member, as an environment Minister and as a former emergency services Minister. Give us a bit of that background and tell us why this has been repeatedly rejected in the past.

Mr DEBUS: It is true. I was part of Cabinet deliberations in and around the year 2000 which followed, amongst other things, the inscription of the Blue Mountains National Park on the World Heritage List and also, quite separately but of great importance, advice from the State Emergency Service that there was cause to be very concerned about the possibilities of flooding in the Hawkesbury-Nepean catchment. At that time all of the characteristics that are now familiar to you, no doubt, through other evidence and indeed from the Government's own report about the particular characteristics of flooding in the Hawkesbury-Nepean were described.

There was concern at that particular time especially about the safety of the dam wall itself. A number of decisions were then made. A lot of money was spent to install the safety spillway which now exists. But it was also then understood that evacuation arrangements were not good enough. It was at that time that, for instance, the decision was made to build that viaduct between Windsor and Rouse Hill and there were other road improvements. I would be the last to suggest that there could not be still more.

But at that time there were people—they were essentially developers—arguing that we needed somehow or other to make provision to enable more building on the flood plain. Those notions were rejected at that time for what seem to me to still be the totally sensible reasons that you cannot guarantee that there will not be serious

floods. There is evidence in the papers that I have seen before you now that the raising of the Warragamba Dam wall cannot logically prevent some of those floods. I will not say anything I do not for sure. Half of the terrible floods really come from somewhere else, not from the Warragamba catchment at all.

The Hon. JOHN GRAHAM: Given you are across those discussions, let me ask you about one specific proposition. What do you think of the assumption which is not questioned in the Infrastructure NSW paper, that of doubling the population in this area over the next 30 years? Given that debate, given the discussion about evacuations, what is your view on that doubling?

Mr DEBUS: As I hope I said in my introduction, I think the prospectus for this proposal makes a proposition that should be the question. Everywhere in the world people are understanding that one ought to actually withdraw populations from flood plains, not add more to it. Everywhere in the world people are saying now, and I refer to Professor Pittock amongst others in this respect, that a one-in-100-year flood measure is inadequate—it is not an adequate criteria on which to base building permissions. In the Netherlands I think they are using one in 1,250 years or something but in the United States, which is possibly a better comparison, it is normal to use a one in 500 year measure.

On top of all that, it is not in any way established that raising the dam wall will stop major floods. We should be thinking not about putting more settlement on the flood plain; we should be thinking about withdrawing it. Putting more settlement on the flood plain is self-evidently, in my mind, putting more people in harm's way. If it is not, someone ought to prove it. It is most extraordinary that we can be talking on the one hand about such a mammoth potential emergency and disaster and on the other not having an open inquiry about it. I have not had to talk in extreme political terms much in recent years but I must say I truly think it is astonishing that on the one hand the Government can be talking about the need to protect the lives of people on the flood plain and on the other behaving in a way that will actually put more people at risk.

The Hon. JOHN GRAHAM: Thank you for those comments. Let me zoom in just a little closer onto one of those developments, again proposed and rejected in the past, repeatedly discussed out there, and that is the Penrith Lakes development of 4,900 dwellings, land that is also on the flood plain and also potentially at risk in a flood scenario. You have made some general comments there—very strong comments. Do you have any recollection of this development being proposed in the past or any views about this specific proposal?

Mr DEBUS: I cannot say that I have specific recollection of that proposal but what we understood 18 years ago was that we ought to proceed with more caution, not less, about any further development on the flood plain.

The Hon. JOHN GRAHAM: Thank you. I might just ask some questions now about the cost-benefit analysis [CBA]. Firstly, you have given evidence today that this has not been made public. Thank you for that. Have you attempted to have this document made public and how did you go?

Dr MOUSSA: Well, I attempted to read it. I asked if I could read the document. I emailed Infrastructure NSW and asked if they could make the document available to me. I received a reply quite quickly that they could not but that a certain person—I have a record of her name—would be willing to speak to me. But then I realised that this person was a publicity officer. She was not actually somebody who would be expected to have read the article or be familiar with the procedures, so I consulted some of my colleagues in the School of Economics who suggested that I write back and ask why the CBA could not be made available and whether an EIS of the impacts upstream was included in it. I did not receive a reply, and that was over a month ago.

The Hon. JOHN GRAHAM: To a pretty reasonable question, you would have to say.

Dr MOUSSA: Yes. The reason this is extraordinary is that one of the essential purposes of conducting a CBA is that you lay out explicitly for all rational persons to see how you have arrived at your conclusions. So the idea of a CBA being secret when there are no commercial-in-confidence issues or other issues—because if there were, surely they would have told us—is extraordinary, to say the least.

The Hon. JOHN GRAHAM: You have given evidence in your submission, information that says one thing that was not examined—you have referred to it this morning—is those urban development decisions, the number of people coming into this area, moving in over 30 years, really has not been the subject of cost-benefit analysis as far as you can tell.

Dr MOUSSA: Can I clarify that? It is a little bit difficult to explain in a short way but I will try to do so. When you are conducting a CBA—I hope I do not bore everyone to tears with this—you have to be able to distinguish the likely effects, the costs and benefits, of the project under investigation from any other events which happen to be taking place at the same time, otherwise it is meaningless. What economists do—because a CBA is

really orthodox economic procedure; that is what it is; it is just a word for that and an application for it—is routinely extract from any other events which are likely to be taking place during the period under investigation by means of what they call a ceteris paribus device. That means that you assume that all other things are likely to remain fairly constant. This is a reasonable assumption to make because nobody is a prophet unless you anticipate a major event occurring in the proximity of the event or project under investigation. Not only does this CBA anticipate but also it almost predicts it. The problem with that is when you have got a major event like this development—

The Hon. JOHN GRAHAM: In fact, it is even stronger than that because the Infrastructure NSW document sets outs its methodology. Step 1 of that methodology is to "establish the different levels of urban development (population) that could occur by 2041". That has not occurred, has it? We are not looking at different levels of population, we are just assuming that the population will increase? Development will take place.

Dr MOUSSA: They do model a non-development option but significantly it is the development scenario, if the development takes place which gives the most significant benefits and that becomes important when comparing the costs and benefits of the five projects. The important thing is not only do they assume that things like local council regulations and major roadways and commercial centres are going to remain unchanged despite basically building another city, they do not seem to appreciate the widespread and the spill over cumulative effects of such a development and that comprises all their figures.

The Hon. MICK VEITCH: Professor Khan, thank you for your submission and your attendance at yet another parliamentary inquiry in the New South Wales Parliament. Your submission and your opening comments relate to water quality. In your view even partial inundation or temporary inundation will have an impact on water quality. Will you explain how that occurs?

Professor KHAN: The riparian zones are the areas around the catchment which are not normally inundated and traditionally have not been inundated for a very long period of time accumulate contaminants. They accumulate things like animal faeces, for example, which can contain pathogens and cryptosporidium being an example that all of us are most familiar with. The likelihood of a sudden influx of pathogens from a flooding event is very high and very difficult to predict, understand, manage and control. When Sydney had its cryptosporidium incident in 1998 we were very lucky—you would not think we were lucky. We did not know very much about cryptosporidium at the time and now we know that that particular strain of cryptosporidium was most likely a strain that was not pathogenic to people so there was not a big public health outbreak.

But in other cities where similar incidents have occurred people have died. There can be a very significant public health impact from cryptosporidium contamination of a drinking water supply. And that is a very realistic scenario in this type of flooding event. It is not limited to cryptosporidium. We would also be very concerned about organic matter so you have a lot of decaying vegetation, leaves and dirt that will be sitting there in the riparian zones or in the flood area which, when the flood water comes along, will wash all of that into the water. You can have a look, for example, at what happened on the Hunter River about two years ago in 2015, 2016.

There was a flooding event and the accumulated organic matter in that case washed into the river and it caused what is called a black water event. The organic matter decays, the bacteria that decayed that organic matter consumed oxygen, the oxygen concentrations drop in the waterway, the fish die. It has a big environmental impact but big water quality impacts as well. The chemistry changes. When the oxygen concentrations drop like that certain minerals become soluble, manganese, for example. Manganese causes water quality problems downstream once you get to the water treatment plant and you start re-oxidising with chlorine.

Lots of organic matter in water—if you increase the dissolved organic carbon concentration in water which an event like this would almost certainly do, that increases the chlorine demand. You have to add more chlorine to the water in order to be able to achieve an adequate disinfection residual. When you add more chlorine it reacts with the organic matter. You produce disinfection by-products, some of which are carcinogenic. There is good epidemiological relationship between the concentrations of disinfection by-products and cancer outcomes such as bladder cancer.

We are causing public health impacts as a consequence of reduced water quality in that sense. Turbidity—a lot of sediment would be another big issue where you would be concerned about the sediment coming into the lake, reducing photolytic penetration through that water column, causing significant difficulties with our treatment processes. It is a filtration process at Prospect and the higher the turbidity the greater the difficulty in treating the water and the greater the difficulty in meeting the level of treatment that is required in order to provide safe drinking water to Sydney's customers. So there is a public health risk associated with that as well.

If there had been a bushfire in the catchment then you would be concerned about ash and increased sediment, much of which would contain phosphorous, important nutrients—nitrogen and phosphorous would both be elevated in concentration in the reservoir. Nitrogen and phosphorous lead to cyanobacterial growth. We had a big cyanobacterial growth in 2007 in Warragamba in the middle of winter in August. Cyanobacteria cause many problems. They cause taste and odour problems with drinking water which can last months, and that bloom did last months. It lasted until well after Christmas after the end of 2007. They can also produce toxins—in fact, they produce some of the most toxic chemicals that we know. Normally do not die from exposure to cyanobacterial toxins because the water smells and looks so bad that people would not drink it but animals do. We know that cattle and sheep have died from drinking out of reservoirs where we have high concentrations of these toxins.

They are all things that would cause difficulties in providing safe drinking water to four, five, six million—who knows where we will be at in coming decades. I suppose plenty of people have a good understanding of where we are expected to be. But they would cause major challenges to continuing to provide safe drinking water for Sydney's drinking water customers.

Mr JUSTIN FIELD: Professor Khan, I will continue along that line of questioning. Are additional costs associated with addressing those water quality impacts?

Professor KHAN: Absolutely. We would almost certainly be wanting to do improved catchment management if you are looking at areas where there may be inundation during a flood event. There would be additional work that would be required in managing those parts of the catchments, trying to protect against slumping riparian banks, et cetera. There would be a lot of science costs in terms of trying to come to a good understanding of what is going on and how we might be able to manage it.

But there would also be costs associated with the treatment of the water. I mentioned that you would increase chlorine demands. You would increase chemical demands at the Prospect Walter Filtration Plant. You would have increased amounts of coagulants that you would be required to add to the water before the filtration process. The filters would require increased backwashing because of the extra turbidity load coming onto those filters. Yes, there would be significant costs at the water treatment plant in order to be able, as best as you can, to produce safe drinking water.

Mr JUSTIN FIELD: Dr Moussa, do you know if those costs been factored in in the cost benefit analysis?

Dr MOUSSA: This is the problem. We have to go by this summary and also by the Molino Stewart documents. What is really interesting is the disparity between the Molino Stewart documents and the Infrastructure NSW 2017 summary, although I do not want to go off track. We have to go by what they given us. So we have to assume that if it is not mentioned in this summary document they have not considered it. They did not consider that in the summary document.

Mr JUSTIN FIELD: That is useful to know. Professor Khan, water quality impacts point to the value in diversifying supply. I know your expertise is in water quality but you specifically mentioned diversifying supply. It would seem to be that money not spent on raising the dam wall could be put towards other supply alternatives whether that be through efficiency reducing leaks or the like. Can you add anything else to your submission around those supply options? What do you think offers the best alternative scenario in this case?

Professor KHAN: Yes, we have learnt from other cities around the world, particularly during big water quality events that a diversified supply provides flexibility. It provides a capability to be able to respond.

A good example was in Brisbane during the 2013 floods. Brisbane almost ran out of water because of the turbidity—the same issues that we are talking about—coming down the Brisbane River into the Mount Crosby water filtration plant. The turbidity reached 4,000 NTU, which is effectively mud coming into the plant. They were backwashing the filters so much that they were not able to keep up with the rate of water demand that needed to be produced. What effectively saved Brisbane on that particular occasion was being able to pump water up from the desalination plant down at the Gold Coast up to Brisbane and to be able to relieve pressure off Lake Wivenhoe at that time. There are many other examples of how cities have relied on a diversified supply to be able to address these sorts of scenarios.

In Sydney, as you know, 80 per cent of our drinking water is stored in Warragamba and most of the rest is in the southern dams, all of which comes through Prospect Water Filtration Plant. That leaves us in a situation where if we were to have a water supply problem either at Warragamba or at Prospect Water Filtration Plant there are very few scenarios, very few options, to be able to deal with that. We do have a desalination plant which is 15 per cent of current supply capacity, so that is a good example of potential available alternative supply, albeit

very small, that you can fall back on when you need it. But other cities around the world actually have a strategy in place now to really look at flexibility, to look at diversification.

If we did have a larger supply coming from seawater desalination, if as you said we had options around efficiency and we could look at non-potable storage of water and rainwater tanks in people's houses—all the things that we talk about during droughts—and we could look at recycled water and how we might make a lot better use of water that is currently wastewater and discharged to the environment, all of those things can contribute to a more resilient diversified water system

Mr JUSTIN FIELD: The summary document seems to very quickly go to the assumption that decreasing the full supply level, which is one of the alternatives, creates a supply challenge that is almost insurmountable. Do we think that the opportunity cost of not looking at that in more detail has really undermined the value of the cost-benefit analysis in the summary document?

Dr MOUSSA: That is actually the subject of the research of Turner et al. They are a team of engineers, economists and environmental scientists. They use a different kind of modelling. They do a CBA but they use probably what is more appropriate modelling, dynamic systems modelling. Just to cut to the chase, they investigated two proposals to raise the crest of the wall and two proposals to actually lower the full water supply level in conjunction with altering the trigger levels for the activation of the Sydney Desalination Plant and the trigger level for commencement of the proposed second desalination plant, the five metre lowering. I will not go to that. It is quite complex, but what they conclude is that—believe it or not—the construction costs and operating costs, the fixed and marginal costs, of raising the wall by 15 metres, lowering the full supply level by five metres and lowering the full supply level by 12 metres, in conjunction with changing the triggers, are very closely comparable.

The one they choose is lowering the full supply level by 12 metres because when you factor in the environmental costs and logistical problems of raising the dam wall, in a broader analysis apart from construction costs, it is the least cost option and it simultaneously addresses the drought issues and the flood issues. It is a really substantial piece of work. I do not understand why it was not referred to. They say it is going by figures which are publicly available, they would like to see more figures, but it is much more substantial than Resilient Valley, Resilient Communities and there is your other option.

Professor KHAN: There are other significant advantages that should be considered for that particular option. Some of them I think are very important. One of them is that you would get a flood mitigation solution immediately. You do not have to wait for the dam wall to be constructed. There is 600 gigalitres sitting there right now today which you could maintain and take advantage of for that purpose. It is probably closer to 700 gigalitres at the moment.

Another advantage is that you would delay a lot of the costs. You have got the current seawater desalination plant sitting there now. If you are talking about expanding it to 500 megalitres per day from the current 250 megalitre per day capacity, you have got the opportunity to build additional seawater desalination capacity. The research paper that we were just talking about canvasses up to four seawater desalination plants. But you would not build them all up-front and say, "Here's our solution." You would build them as you need them, which could be putting off the cost for many decades, I would think. We will have to wait and see what happens with the weather. So another potential advantage there is the delayed costs associated with it.

Another advantage is that if you store less water in Warragamba then by definition you are releasing more water down the Warragamba River and into the Nepean River, so you would have improved water quality in the Nepean River and therefore enhanced recreational value for fishing and for swimming for people who live in Western Sydney. Very importantly, the North Richmond Water Filtration Plant draws its water for the Nepean River. It draws the worst quality raw water in Sydney at the moment because of the very low flows and the algal growth that it leads to in the Nepean River and salinity as well and organic carbon concentration. By having a better flushed river and by having more regular flows down that river as a consequence of retaining less behind the dam wall, you potentially have very improved drinking water quality for the people of north-western Sydney that draw water from the North Richmond Water Filtration Plant.

The Hon. NATASHA MACLAREN-JONES: I understand that the task force began looking at this about four years ago. It looked at a number of recommendations about flooding in the area and looked at around 20,000 different scenarios, coming forward with the preferred option of raising the dam wall. I am interested to know your view on the step we are at now, which is the EIS process. Would you think it should stop now or should it continue through so that all the information is presented and the surveys are completed, which is where we are at the moment?

Dr MOUSSA: What is expected to be contained in the EIS process properly should be included as part of the quantification of variables in the CBA. I should draw your attention to the fact that in this CBA, as summarised, not the full-on EIS, those environmental impacts were considered, according to Infrastructure NSW, so thoroughly not for upstream of the Warragamba Dam but with regard to the Currency Creek diversion and the dredging and they decided that these EIS impacts were so substantial that they were not infrastructure options. Yet, strangely enough, the only environmental impacts missing from that document are the ones for above Warragamba Dam. That is a strange inconsistency. They know that they should have considered the environmental impacts in the document because they did so for the other infrastructure options. They did not consider those impacts for option one.

The Hon. NATASHA MACLAREN-JONES: But according to the submission that has been provided by the Government outlining the time line in relation to the proposal of the dam, at the moment they are still in the process of public consultation and gathering additional information. Next year they will be looking at the environmental planning consideration and not until 2020 will they actually look at construction. This is the time when that additional information is being brought forward. This legislation is allowing them to gather that additional information that they could not do before. Are you suggesting everything should just stop? I am asking whether or not the best thing is to continue on to get the additional information that is required to make a further review of the situation if one is required.

Dr MOUSSA: Molino Stewart, who were commissioned by Infrastructure NSW and, I understand, the Department of Primary Industries to investigate this—I think that was the original task force or part of it—they emphasised, and this is also quoted by the Turner et al document, that that investigation should take place before an infrastructure flood mitigation infrastructure proposal is chosen. They emphasised that. What they are saying is you do not do that investigation after you have already picked your option; you do it before you pick your option, so we have got the cart before the horse.

The Hon. NATASHA MACLAREN-JONES: But that is the challenge of the legislation and that is what this legislation is addressing?

Dr MOUSSA: It is not additional, it is fundamental. With due respect, you are calling it additional but it is actually fundamental, which is why the environmental impacts for Currency Creek and dredging were not classed as additional and not scheduled to take place after choosing an infrastructure option. They were, as far as we can tell, conducted before choosing an infrastructure option.

The Hon. NATASHA MACLAREN-JONES: But this legislation allows them to gather the additional information that is required?

Dr MOUSSA: It is inappropriate to choose an infrastructure option when you have left key variables out of the investigation. They have already chosen an infrastructure option. This is the point.

The Hon. NATASHA MACLAREN-JONES: But the task force has looked at all the options presented before them and they made an informed decision based on the evidence and information provided to them?

Dr MOUSSA: Well, you are saying yourself, sorry, with due respect, that the information on the environmental impacts above Warragamba Dam were not available to them.

The Hon. NATASHA MACLAREN-JONES: I did not say it was not available; I am saying this legislation is allowing them to do the next step, which is to identify more specific things that might be needed to be looked at, which were some of the things that were raised this morning, so the important thing is identifying what additional information needs to be looked at?

Dr MOUSSA: As far as I can tell the legislation aims to do more than that, but I suppose we can debate that until the cows come home.

The Hon. RICK COLLESS: Can I just follow on from that, Mr Chair? In your understanding then, Ms Moussa—

Dr MOUSSA: Dr Moussa, sorry.

The Hon. RICK COLLESS: Sorry, Dr Moussa. What do you see the legislation as doing?

Dr MOUSSA: To me it is not entirely clear what it is doing because it appears to be quite vague.

The Hon. RICK COLLESS: It is certainly not giving approval to the raising of the wall for flood mitigation purposes, though, is it?

Dr MOUSSA: We would have to analyse that.

The Hon. RICK COLLESS: Well, it is not doing that. It is quite clear.

Dr MOUSSA: It does not appear to be specifically asking for an EIS.

The Hon. RICK COLLESS: What it is doing is putting an amendment into the National Parks and Wildlife Act which allows those assessments to go ahead; that is the purpose of the bill.

The Hon. JOHN GRAHAM: That is certainly disputed. I agree with your former comment; just for clarity, you are entirely correct, but the confusion is because we do not agree that is the effect of the bill and I suggest we ask the government panel exactly that question.

The Hon. RICK COLLESS: We will indeed. I have some other questions for you, Professor Khan. I am interested in your comments in relation into the questioning of Mr Veitch and Mr Field when you talked about water quality issues. Those issues are going to occur during periods of heavy rainfall irrespective of what the water level in the dam is—yes or no?

Professor KHAN: Yes and no. Yes, heavy rainfall is absolutely associated with lots of those sorts of events because when you get heavy rainfall you are getting run-off—

The Hon. RICK COLLESS: Indeed.

Professor KHAN: —from the catchment but in this case we are talking about something a bit different, which is actual inundation. So you would change the mechanisms of contaminant transport when you have actual inundation. You start to float things. Various contaminants, sediment for example, will be picked up and will become much more mobile into the waterway than it would be just through a heavy rainfall event that does not involve actual inundation. So, yes, that is associated with serious water quality impacts but this is a different scenario and this is potentially, I think likely, to cause much more significant water quality impacts. You also have dissolved organic matter and dissolved organic matter, when you have soil that is not traditionally inundated and it becomes inundated, then that organic matter will become more soluble into that water and more likely to be moved in a big sudden flux into the lake.

The Hon. RICK COLLESS: The total catchment area of Warragamba is 9,050 square kilometres so what is going to be the significance of the 0.4 of a square kilometre that is in the inundation zone, given the 9,000 square kilometres of the total catchment?

Professor KHAN: A big part of the problem is that I do not think anybody can answer that: What is the significance? That is a big knowledge gap but we know that it is a real risk that leaves us open. I do think it is an important point to make, though. You are talking about a big catchment that rainfall lands on and the water moves through. A lot of that movement of water is actually underground; it is below the soil level, which produces a filtration effect. It actually produces a water quality improvement as the water moves through the catchment and then down into the creeks and tributaries.

The Hon. RICK COLLESS: But that only occurs until such time as the soil is fully saturated, yes?

Professor KHAN: Right. So if you have a flooding event, then you are starting to come closer to the—

The Hon. RICK COLLESS: Which is what we are talking about?

Professor KHAN: —sorts of things that we are talking about. Yes, if you flood a larger area, you have a bigger impact but the point is: A flood event where you have inundation and you have a depth of water that can then flow freely into the lake is very different than water that infiltrates through moist soil on its way into the lake, which has a cleansing effect, a water purifying effect, as opposed to picking up contaminants and washing them in like you would wash contaminants off your footpath with a garden hose.

The Hon. RICK COLLESS: If I go back to my first scenario, if we are getting a period of extended rainfall, for example, to create this sort of flood event that we are talking about may well require four or five days of 100 millimetres per hour rain, in which case every drop that falls is going to be running over the surface?

Professor KHAN: I agree with your general point that a big heavy rainfall event causes water quality risks regardless and they are unavoidable. However, I think that intentionally leading to areas which are going to be inundated for some period of time escalates that risk considerably. Even if you are talking about a relatively small proportion of area compared to the size of the catchment as a whole, you have local circumstances where—if you look, at the McClellan inquiry and look back, there is an example that proves your point to a degree because

the cryptosporidium incident was a consequence of a heavy rainfall event in the drinking water catchment, which washed cryptosporidium into the reservoir, so you are absolutely right in that sense.

However, when you look at the report in detail and you understand as best as we could at the time the mechanisms that were involved, one of the things that has the finger very clearly pointed to it is that there was faecal material most likely—none I specifically identified but most likely faecal material that was lying in depressions, lying in areas that normal rainfall events would not mobilise, but when you have a very large rainfall event, then the water level actually rises, the rivers start to break their banks or come close to breaking their banks in particular areas and that is when the faecal material washes off. So the concern I have is that in this case we are actually engineering that scenario; we are engineering increased flooding and increased inundation as opposed to, yes, what would already be a large amount of run-off from the catchment running through at a lower level through the soil than what you would normally have.

The Hon. RICK COLLESS: Okay. Have you got any figures on what the one in a hundred year flood flow into Warragamba is?

Professor KHAN: No.

The Hon. RICK COLLESS: We talked about the 700 gigalitres of airspace that is there at the moment that is essentially a flood mitigation tool if this rain continues for a week?

Professor KHAN: Yes.

The Hon. RICK COLLESS: Let us hope it does. The flood storage level—I have not got these figures and I am asking if you know—at that 14-metre upper level would be a lot more than 700 gigalitres, would it not?

Professor KHAN: I presume so, yes.

The Hon. RICK COLLESS: You do not have any figures as to what that might be?

Professor KHAN: No.

The Hon. RICK COLLESS: We will certainly ask the people this afternoon that. I would be interested to know that because it is all very well to say that if we reduce the full supply level, that is giving airspace which is there for flood mitigation but of course—

Professor KHAN: I agree, but you can look at different levels—

The Hon. RICK COLLESS: If you put that on top it is going to be a lot more volume than that.

Professor KHAN: I think it is going to be a percentage more; I do not think it is going to be twice as much. But it is not an all-or-nothing scenario here. I think even if you have 70 per cent, 80 per cent of the potential flood mitigation capacity, you have a smaller proportion of it, 70 or 80 per cent of it, then you are still taking the big damaging events off some of those big floods. So yes, you might not solve the problem entirely, but just having a big impact on the potential downstream flooding is certainly a significant benefit that should be not dismissed.

The Hon. RICK COLLESS: Significant, but I guess the bottom line would be that the reduced flood level downstream would be less than it would be if it was—

Professor KHAN: Yes, but you could follow that argument through to any logical extreme. You could say why stop at 14 metres? Why not go to 20?

The Hon. RICK COLLESS: I did consider a 20 metre height and it was rejected.

Professor KHAN: Presumably because of the cost-benefit analysis. What I am saying is that there are compromises. It is fundamentally a wicked problem. There is no great solution either way that you look at it.

The Hon. RICK COLLESS: I have got one other question for you, Mr Crates, about the regent honeyeaters. What main breeding areas are there for regent honeyeaters in New South Wales?

Mr CRATES: Having surveyed for them throughout their range in New South Wales, we found that the main breeding population, which is probably between 150 to 300 birds—that is our best guess—occurs within the greater Blue Mountains. So we are talking from the Burragorang Valley, the Capertee Valley, the Wolgan Valley, up into the Upper Hunter and the Lower Hunter. What we know from marking individual birds is that the birds move quite long distances between these populations. We kind of see what is called a metapopulation. In some years the birds may all be in the Capertee Valley, in some years they may be in the Lower Hunter.

The Hon. RICK COLLESS: The same birds?

Mr CRATES: Potentially, yes, for sure. The problem with the Burragorang Valley is that it is much less surveyed than other areas, and that is primarily due to inaccessibility, lack of public records. So given this lack of monitoring data, with the data we have got we can have a really strong suggestion that there will be a major impact on the regent honeyeater if the dam wall is raised, but because of a lack of standardised monitoring and historical data from this valley, we do not know exactly how important it is to the population. There could be years where we do not find the birds in the areas where we have been looking traditionally, and then they are all in the Warragamba catchment, and that is why we do not find them.

The CHAIR: Thank you for your time this afternoon. No questions were taken on notice due to the truncated nature of this inquiry. Thank you again.

(The witnesses withdrew)

ANDREW GEORGE, Executive Manager, Asset Solutions and Delivery, WaterNSW, affirmed and examined

COLIN LANGFORD, Director, North West Precinct, Sydney Division, Roads and Maritime Services, sworn and examined

BRETT WHITWORTH, Acting Deputy Secretary, Planning and Design, Department of Planning and Environment, affirmed and examined

JIM BETTS, Chief Executive Officer, Infrastructure NSW, affirmed and examined

MAREE ABOOD, Executive Director, Strategic Water Planning and Infrastructure, Infrastructure NSW, sworn and examined

PETER CINQUE, Manager, Business Support Services, NSW State Emergency Service, Metro Zone, sworn and examined

The CHAIR: Would anyone like to make a short opening statement?

Mr BETTS: I will do that on behalf of all the agencies represented here. I believe you are in possession of a consolidated submission from all the agencies.

The CHAIR: Yes.

Mr BETTS: I want to emphasise five points in opening up. The first is that to get to this point we have collectively undertaken four years' worth of work to understand flood risks in the valley, to understand probabilities and to understand the impacts of potential flood events. That has involved a rigorous analysis of possible mitigation measures—measures which involve infrastructure, measures which do not involve infrastructure—and you will note on page 17 of our submission the wide range of options that has been considered to date. That analysis has led us to the conclusion that, on the face of it, raising the Warragamba Dam by 14 metres strikes the right balance between costs and benefits and between safety considerations and environmental considerations.

My second point is that this is a hypothesis which will now be rigorously tested through the planning process. An environmental impact statement [EIS] will be completed for exhibition from mid-2019. We have already undertaken quite significant levels of consultation, but very intensive consultation will take place around the EIS, submissions will be received and responses to those submissions will be documented by us. As the proponent, WaterNSW will then need to seek approvals from the planning Minister at State level and from the environment Minister at Commonwealth level and then, and only then, once the planning approvals are in place—assuming that those approvals are given, and they will not be in the hands of us, they will be in the hands of the Ministers I have just described—it will be down to the New South Wales Government of the day, the Minister of the day, to consider a final business case and take an investment decision. Then that would lead to a construction period of about four years. My two opening points are four years of work to get to this point and a lot of work still to go.

Thirdly, we are very conscious of the need to do a very rigorous job around the environmental impact statement. All the work that is going on at the moment around flora, around fauna and around Aboriginal heritage, all of that will be fully assessed, documented and exhibited, and if there are suggestions coming out of this inquiry about how we can improve engagement or the methodology underpinning the EIS those recommendations will be welcome. But my fourth point is that the proposition to raise the dam wall is an evidence-based proposition, not something we have simply dreamed up. We have plotted, in the course of the last four years, every dwelling, every car, every asset, every household in the valley. We have run multiple scenarios for rainfall events, for land use development, growth patterns and evacuation behaviour. We have undertaken tens of thousands of different scenario analyses and we have had those peer reviewed and sensitivity tested. So a lot of work has been done to date.

The upstream inundation associated on a temporary basis with raising the dam wall is a serious environmental matter that will be seriously addressed in the EIS. But I would say that word "to date" suggests that needs to be seen in the context of the fact that there is already a 142-metre dam wall in place, which causes permanent and temporary inundation. The temporary nature of the inundation for a maximum of two weeks and the fact that the area affected by that temporary inundation, which is depicted on page 12 of the submission in figure 4, is equivalent to 0.06 per cent of the world heritage area in terms of the incremental inundation on a temporary basis associated with a one-in-100-year flood event, which is by definition a relatively infrequent event. That needs to be seen in the context of the clear and present current risk, regardless of any assumptions you might

make about future growth, to the 134,000 people who are currently living in the valley. A one in 100-year flood equivalent to the flood in Brisbane in 2011 would, on the basis of the rigorous analysis we have undertaken to date, involve SES having to deal with 64,000 evacuees and if 3 per cent of people in the valley fail to comply with evacuation warnings then we could be looking at a potential of up to 2,000 fatalities. That is not a context we can ignore.

Finally, in terms of the legislation itself, the legislation is designed to enable us to proceed to the EIS and focus on the lifesaving function of a raised flood mitigation dam. The National Parks and Wildlife Act currently prevents use of the dam for flood mitigation and we feel as public servants that it will be difficult to put forward an EIS and seek planning approval from the planning Minister at State level and from the environment Minister at Commonwealth level until the legal question about the operation of the dam for flood mitigation purposes has been resolved by the Parliament. There is nothing about the amendment which locks any future government into an investment decision around the raising of the dam, that remains open. But it will enable debate to occur publicly with a clear statutory framework.

The CHAIR: You have given an opening statement for everyone here, is that correct?

Mr BETTS: That is it.

The Hon. JOHN GRAHAM: Mr Betts, that was a helpful introduction. Your last comment has gone to one of the issues the subject of some discussion in the course of the Committee this afternoon: That is, what is the effect, what are the objects of this bill? The objects as we read them relate to the inundation of the land, the operation of a higher dam wall post approval, rather than to allowing an EIS to proceed. Is this bill required for an EIS to proceed?

Mr BETTS: No, the bill is not strictly required for an EIS to proceed. However, it would be very difficult for the planning process to reach a culmination if the planning Minister were confronted with a decision which involved approving a project to raise the dam where the dam could not be operated because a statutory bar was in place. My understanding is it would significantly complicate the process. Ms Abood will add to that.

Ms ABOOD: The EIS can proceed but this is about being very clear about the mechanism of how we would deal with that. Rather than having the EIS focus on the impediment we would like the EIS to focus on the merits of the proposal. The second part of that is to enable the Minister to make a determination.

The Hon. JOHN GRAHAM: That question is fundamental to the urgency with which the Parliament has to deal with it?

The Hon. PENNY SHARPE: If it is not necessary, why now? Have you always planned on this timeframe in relation to this bill?

Mr BETTS: The decision around the timing of the bill is a decision for the Government. We would make the observation that you would be in a difficult position as the planning Minister to be confronted with having to take a planning decision where the statutory position was that the dam could not be operated for flood mitigation purposes and it would be hard to take an investment decision.

The Hon. PENNY SHARPE: That is pretty subjective. You can go through the EIS process. Everyone knows this is a particular issue. If it stacked up, through the EIS process, through the business case that we have not seen.

Mr BETTS: The business case has not been prepared.

The Hon. PENNY SHARPE: Then you would be able to use the legislation to make that change if that was a barrier. It is not necessary that we are dealing with this now in the dying days of this Parliament, being rushed through in this way.

Mr BETTS: Ms Abood may want to talk about the consequences of not legislating now. You are right, it would add significantly to the timeframe associated with the investment decision and delivery of the project and the flood mitigation benefit, but there is a scenario in which the legislation is not enacted now. The question for the Parliament is whether it wants to live with the additional delay associated with the decision-making at the back end.

The Hon. PENNY SHARPE: I think it is holding up a whole lot of development. The urgency of the Government is there.

Mr BETTS: Would you like us to respond to that? You have made an observation.

The Hon. PENNY SHARPE: I would like you to respond to the issue around everyone here accepts that there are people living on the flood plain and there are difficult issues here. No-one is suggesting it does not need to be dealt with. What is troubling us is whether there are other alternatives, given the significant impact, that this is the choice you have made. We have had several Government members suggest that there is no plan to put extra people on to the flood plain when we know that your own report on page 3 says there is going to be an extra 130,000 people moving on there. My question is the interaction between this and development, is it part of the rush around this bill to facilitate some certainty for developers in Western Sydney?

Mr BETTS: I would like to respond to that. This is not about facilitating additional development in the valley. This is about protecting human life. As I said before, if a one-in-100-year flood event occurred tomorrow we would be looking at a very significant event.

The Hon. PENNY SHARPE: This does not solve all of the flooding issues, you have to be honest about that.

Mr BETTS: It does not purport to solve all the flooding issues, but it very significantly reduces the flood damage by an estimated 75 per cent.

The Hon. PENNY SHARPE: How did you come up with that? You have it in your report, but it is not footnoted. We are interested in the detail, this is a serious issue.

Mr BETTS: What are you interested in exactly in the detail?

The Hon. PENNY SHARPE: More broadly I am interested in all of your reporting. We know that people have tried to get the sources. A lot of it is unsourced. We have asked for the information of the sources so that people could look at the assumptions made in your modelling and that has been refused. We are interested within this work how much of it has been peer reviewed. We have had evidence that suggests virtually none of it has. We understand it is a serious problem. In terms of building trust about why and when and how and whether alternatives are being dealt with we want full transparency and we are not getting that.

Mr BETTS: You will have full transparency through the environmental impact statement process. We have done an enormous amount of analysis, we have put an enormous amount of analysis into the public domain already. We have undertaken a lot of consultation but the EIS is the main game.

The Hon. PENNY SHARPE: The key documents are not there.

Mr BETTS: If there is a list of documents that people would like to see disclosed that have not been disclosed, the evidence is our friend in this because we have done four years worth of work, we have modelled 32,000 scenarios.

The Hon. JOHN GRAHAM: One of those documents was the cost benefit analysis that underpins each of the assessments.

Mr BETTS: Are we talking about assessments here around alternatives to the raising of the Warragamba Dam?

The Hon. JOHN GRAHAM: Correct.

Mr BETTS: Why do we not talk about those, if you have questions you want to ask about those.

The Hon. JOHN GRAHAM: My specific question is: are you willing to release to the Committee and to the public those documents that underpin the cost benefit analysis for those alternatives?

Mr BETTS: We are prepared to release any information that enlightens the community about why we reached the view we have.

The Hon. PENNY SHARPE: You are aware that you have refused Government Information (Public Access) Act applications from individuals who have been seeking this information?

Mr BETTS: I do not know what information you are talking about.

The Hon. PENNY SHARPE: Source documents that sit behind the "Resilient valley resilient community" Infrastructure NSW report?

Mr BETTS: You would have to be specific about which documents.

Mr JUSTIN FIELD: The ones listed in your report.

Ms ABOOD: That information is being prepared, it will be released as part of the EIS process.

The Hon. PENNY SHARPE: Why have you refused to release it to community members who have sought it under freedom of information laws?

Ms ABOOD: Because it is informing the EIS process.

The Hon. PENNY SHARPE: If you say there is no problem, why can you not release it?

Ms ABOOD: The documents informed a Cabinet decision.

The Hon. JOHN GRAHAM: If that is the case, you are going to refuse to release it down the track, are you not?

Mr BETTS: No, we are preparing an environmental impact statement which will conform with the requirements which are stipulated under legislation by the secretary of the Department of Planning and Environment by the Commonwealth and that specifies the data that we have to put in the public domain, and that will be put in the public domain. What we have been anxious to avoid is pre-empting decisions around what goes into the EIS, putting information out there which is incomplete or partial. A much cleaner process and a better informed community debate will flow if we have the opportunity to pull together a coherent EIS, which we intend to do by the mid part of next year. Then that will be put on exhibition and will be subject to full consultation. To the extent that there is any alleged secrecy about this, it is simply about the timing of putting information out in a balanced fashion, rather than dribbling it out into the public domain in a way which simply confuses the community.

The Hon. PENNY SHARPE: Do you see the problem that we have got? We are lawmakers here. The Government has brought before the Parliament a bill that has significant implications, that really is only leading us down one path, which is raising the Warragamba Dam wall, and we do not have the information to enable us to make these assessments. As I said to you earlier, this is a matter we take very seriously, we know the SES take it very seriously, they have given many reports about the flood issue over a long time—

Mr BETTS: They have.

The Hon. PENNY SHARPE: —and the Government has done nothing. To be clear, Ms Abood is saying no, we cannot have it because it is Cabinet in-confidence. You are saying perhaps she could give it to us.

Mr BETTS: You have not specified what information it is that you want.

The Hon. PENNY SHARPE: The source documents that you relied on that are listed in this report.

Mr BETTS: Do you have particular questions that you would like us to answer?

The Hon. PENNY SHARPE: We want to see the document. We want to see the source documents that you draw it from.

Mr BETTS: Tell me the name of the document. I cannot talk about a document which is—

The Hon. PENNY SHARPE: We do not have time to do that. What we are asking for is transparency on what is a very difficult decision, that has very significant environmental impacts, that has incredible impacts on the Indigenous people. The Government is negotiating a land use agreement with a group of traditional owners and does not even tell them, "By the way, we are going to flood half your cultural sites." It is a significant issue. I am very happy to give you a list of exactly what we want after this hearing, if you are prepared to provide it. It is not that hard. It is basically all the source documents that you have got in this report to justify the decision-making that you have made, because it is not clear.

Mr BETTS: The only decision that is being asked of the Parliament at this stage is to enact legislation which is essentially permissive, which removes the statutory bar on the capacity to temporarily inundate upstream in the valley.

The Hon. PENNY SHARPE: Which you said is not necessary at this point.

The Hon. JOHN GRAHAM: We are being told that we will get the information later.

The Hon. NATASHA MACLAREN-JONES: Point of order: The Hon. Penny Sharpe asked a question and I would like the witness to be given the opportunity to answer.

The CHAIR: I would also like to hear Mr Betts answer that question.

Mr BETTS: Sorry, what was the question? I got lost somewhere along the way there. What was the question?

The CHAIR: It got missed in the scheme of things.

The Hon. JOHN GRAHAM: We are being told we need to legislate now, but we will get the documents later. Can you see why that is putting us in a very difficult situation?

The Hon. MICK VEITCH: We do not have the information.

Mr BETTS: If you were being asked now to take a decision to raise the Warragamba Dam by 14 metres in the absence of a fully consummated planning process, then absolutely. But you are not being asked to take that decision. As I understand it, what you are being asked to take a decision on is some legislation which is essentially permissive to remove a prohibition on the—

The Hon. JOHN GRAHAM: Which goes to the approval of the operation of a dam, once that is built, something that is well down the track.

Mr BETTS: A dam which has not yet received planning approval, and which has not yet been subject to an investment decision, and would be subject to a planning approval and investment decision by whoever the government of the day is. We have indicated that the EIS will not go on exhibition until next year, and the investment decision will be taken when a final business case is prepared some time after that.

The Hon. MICK VEITCH: To be clear, there has been no decision taken to raise the wall of the Warragamba Dam by 14 metres?

Mr BETTS: We cannot take an investment decision until we have a planning approval in place. Normally in government projects you take an investment decision and then you seek planning approval. In this case we recognise that the environmental sensitivities are such, and the questions of Aboriginal heritage are sufficiently sensitive, that we will undertake a full public EIS process before we then put advice to government on the raising of the Warragamba Dam, and invite government to take an investment decision.

The Hon. MICK VEITCH: One of the things that the Hon. Penny Sharpe was talking about as an example is on page 28 of the Resilient Valley, Resilient Communities paper. It is stated that the dam wall proposal will reduce flood damage by 75 per cent. There is no footnote to direct us on how that claim was derived or what is the methodology for making that statement. If we are going to use this document to assist us in our decision-making, that is one example. What is the documentation that supports that?

Mr BETTS: I will now ask Ms Abood to talk you through the painstaking process that we went through to arrive at that conclusion.

Ms ABOOD: That number is based on average annual damages. Average annual damages is a standard practice that we apply in terms of flood plain management, how we assess flood risk. It is a weighted average because each flood has different impacts. Smaller floods have generally smaller impacts than the more catastrophic, so it is a weighted average. It is the same methodology that the insurance companies use as well. It is standard practice. Basically, what we have done is looked at the existing risk now and the future risk. As Mr Betts has said, we have looked at individual houses, businesses, critical infrastructure, and looked at the whole range of floods, so not design floods, we have looked at 20,000 modelled events, and looked at the impacts that they would have on the important assets downstream, and the communities. It is a standard methodology where you work out the weighted average. For example, if we went for a 20-metre dam it would provide about 83 per cent reduction, but it also has larger impacts upstream. So it is weighing up all of those things.

The Hon. MICK VEITCH: When a statement is made in a document that we have been reading that is fundamental to a decision around our support or not for this piece of legislation, not sourced, the methodology is not sighted, we just have to read it and take it as given, can you understand the problem? The clock is ticking, but there are other examples like that in this document that cause us concern. There is a figure floating around that 45 per cent of flooding occurs as a result of floods from the Nepean. I have had some locals there say to me that is not the case, it is probably more than 45 per cent of floods. What is the Government using to determine the amount of floods that will come through the Nepean, as opposed to Warragamba, the Hawkesbury?

Ms ABOOD: When we look at flooding, we have points at Penrith and points downstream to look at the contributions. Obviously, there are four major dams with contributions upstream. The Nepean catchments generally contribute to about 20 per cent of the area and the inflows generally when you are at Penrith. Warragamba is the largest contributor, it has the largest catchment area. It is 80 per cent to Penrith. For the major floods, Warragamba is always going to be involved because it is the largest contributor of floods. In 1986 because the dam was there and the dam was down a fair way, part of those flows were captured. Warragamba only contributed to about 42 per cent. But that is not unusual for small events. For big flows, for things that are going

to be above the flood planning level or above a one in 50, to a one in 1,000 year event, Warragamba is the major contributor of those flows, because it is like having the largest tap turned on, whereas all the other contributors are much smaller.

The Hon. MICK VEITCH: There is still going to be flooding in this valley, is that right?

Ms ABOOD: Yes.

Mr BETTS: Yes, we are clear about that.

The Hon. MICK VEITCH: We do not want people thinking that this will prevent all flooding, because it will not.

Ms ABOOD: We have never said that.

The Hon. MICK VEITCH: There is going to be flooding.

Ms ABOOD: Absolutely.

Mr BETTS: That is made very clear in our submission.

The Hon. MICK VEITCH: In the document, Resilient Valley, Resilient Communities, on page 3 it talks about the doubling of the population over the next few decades in this area.

Ms ABOOD: Yes. Can I clarify?

The Hon. MICK VEITCH: Mr Cinque, getting people out of this flood zone is critical, regardless of whether the wall goes up or not, is it not?

Mr CINQUE: That is true.

The Hon. MICK VEITCH: Extending the height of the wall does not absolve government of the responsibility of constructing roadways or whatever to get people out of this flood zone, is that correct?

Mr CINQUE: To answer that, there are a whole range of measures to reduce the risk to life and to property, and the raising of the dam is one of those, a major component. There is also road evacuation capacity, which we have looked at. They are much more expensive options, and that is an important factor for the current population to get out. We need more capacity to get people out and we are contributing to a road master plan as part of the strategy to inform future road upgrades in the area, so that the capacity could be built in for the area.

The Hon. MICK VEITCH: We are going to put more people in this flood zone over coming decades. The wall on its own—this is not an and/or, is it? A lot of things have to be done, even if we do not extend the dam wall.

Mr BETTS: You have clearly read out—

The Hon. JOHN GRAHAM: This is a question to the SES first: How comfortable are you with 134,000 more people moving into this area, as is?

Mr CINQUE: It would be our preference as far as possible not to evacuate people, because it is a huge disruption to the community and the economy, so every measure that we can put in place to make sure we can get those people out really helps. That is where the dam option, plus the other suite of options—

The Hon. JOHN GRAHAM: Do you support moving more people on to this flood plain? Other jurisdictions are doing the opposite. Do you support moving 134,000 people on to this flood plain?

Mr CINQUE: I think it would be fair to say that we would rather see not more people exposed to risk. That is a community-government decision to balance up all the risks in the area. It is true that as the evacuation problem increases, the complexity will increase. It will be harder to execute.

The Hon. JOHN GRAHAM: A question to Planning: This report says that we are doubling the number of people living on the flood plain. It talks about the number of people needing to be evacuated moving from 90,000 to 158,000 or 171,000. Is it safe to do that, given the evidence we have just heard that one way or the other these floods are going to happen, regardless of whether this proposal proceeds? Is it safe to move that many people in?

Mr WHITWORTH: As Mr Cinque talked about, this is a measure of how do we manage the risk in the valley and how do we understand how we are looking at that risk? What we have identified, firstly, it is not 130,000 people that we are targeting to move into the valley. What we are dealing with is if existing—

The Hon. JOHN GRAHAM: But you accept on page 3 of this report that the population is doubling? You are not questioning that, are you?

Mr BETTS: Can you just let him answer the question?

Mr WHITWORTH: This is really important. If we work to the existing population projections, the existing trajectory of growth, that is the number of people we would need to be dealing with in respect of moving into the valley. That is not what we are planning for. What we are planning for through the regional planning framework that has been identified as part of Resilient Valleys, Resilient Communities is to look at where is it best and most appropriate to manage the risk of development in the valley. We have already taken decisions to say no to development in the valley. I have heard a lot of—

The Hon. PENNY SHARPE: Can I stop you on that.

Mr WHITWORTH: This is really important because this goes to a matter of fact.

The Hon. PENNY SHARPE: It is not directly relevant.

Mr WHITWORTH: A number of people have said that Penrith Lakes Development Corporation has approval effectively for 4,900 dwellings when, in fact, the Government last year—at the beginning of 2017—created a SEPP that rezoned to allow 30 dwellings and also identified a significant part of that land as being unzoned. The reason that it took that decision is the convergence of the people evacuating out of that area, with the people evacuating out of Windsor and Richmond, meant that it was just not possible. It was too great a risk to allow that level of development.

It would have been good because there is a process that successive governments have been engaged with with Penrith Lakes Development Corporation through a deed of agreement, but the Government had to take the decision that on the basis of that risk that it could not support it. There are other places in the valley where it is possible to match the evacuation capacity with the level of development. We have taken decisions with recent exhibitions in places like West Schofields and Marsden Park North to limit the amount of development that occurs in the one in 100 chance per year flood and the PMF to match with the evacuation capacity. That is not taken on the basis of whether the Warragamba Dam wall would be raised or not. That is looking at evacuation capacity.

The Hon. JOHN GRAHAM: No-one is questioning the assumption that the population will double. That is set out in your document, Mr Betts. That is right up-front in the document.

Mr BETTS: Ms Abood will clarify the difference between assumptions and forecasts.

Ms ABOOD: It needs to be made really clear that the 134,000 that live and work in the valley now, that is an existing risk.

The Hon. JOHN GRAHAM: Which will double.

The Hon. PENNY SHARPE: You are about to double down on that.

Ms ABOOD: No, I said—

Mr BETTS: We have made some assumptions for the forecasts.

Ms ABOOD: It is potential. That is a forecast, it is not a target. So, based on best practice planning—when you are making major decisions and long-term planning about reducing flood risk across prevention—

The Hon. JOHN GRAHAM: I accept it is not a target. It is an assumption that you have left unquestioned.

Mr BETTS: It is an assumption in an uncontrolled environment. What the strategy has done, as you rightly pointed out, has combined infrastructure and non-infrastructure responses. One of the key non-infrastructure responses is what Mr Whitworth has just described, which is a much more risk-based approach to land use planning which will ensure that that kind of open slather development does not occur for precisely the reasons that the strategy has identified around flood risk.

Ms ABOOD: Let us forget about future population growth. We have a significant risk now.

The Hon. MICK VEITCH: Yes, absolutely.

Ms ABOOD: It is 134,000 people now.

The Hon. MICK VEITCH: We do not deny that.

The Hon. PENNY SHARPE: Why are we increasing it?

Ms ABOOD: The management strategy is about managing the future risk. That is about managing, as Mr Whitworth has said, the growth. A lot of this has come from various policies. A lot of these have been in train from 10 years ago in terms of the rezonings of various land so they are coming to fruition now. It is a slow process, but we have put a lot of processes in place, as Mr Whitworth has stated, including the jail. Flood risk is becoming a very important consideration in respect of all major development decisions now.

Mr JUSTIN FIELD: Thank you all for being here today. Ms Abood, before you suggested that some of the documents that underpin the Resilient Valley, Resilient Communities are considered Cabinet-in-confidence or that they informed a Cabinet decision. Without canvassing the decision, I assume we are talking about the decision to go through the planning process for the approval of raising the dam wall. Is that correct?

Ms ABOOD: The strategy, as part of that recommendation, was looking at all options and we put forward those recommendations to Government and it was adopted. That is the basis of the strategy. That was based on a cost benefit that was put forward to Government.

Mr JUSTIN FIELD: Understood. Mr Betts, you then said that one of the reasons you were concerned about putting the information out in the public space ahead of the EIS is that you did not want impartial or incomplete information out there in the public space. Is that correct?

Mr BETTS: That is correct. I was not clear what information was being asked for either.

Mr JUSTIN FIELD: Do you contend—

Mr BETTS: I think an orderly EIS process in which the full suite of documentation is made available to the community at the same time so people can see the full picture is the best approach to informing the community, yes.

Mr JUSTIN FIELD: Would it be fair then for me to leap to the conclusion that Cabinet made a decision based on incomplete information?

Mr BETTS: What was the decision Cabinet made? It made a decision to allocate some $58 million to us to further develop the strategy in order to seek, among other things, environmental approvals and prepare a final business case, none of which involve final decisions in themselves to raise the dam wall. The decision was to go ahead and do the preparatory work so that a future government can make those decisions.

Mr JUSTIN FIELD: In order to develop this plan and put information in front of Cabinet to make a decision, there is a cost-benefit element to this, quite clearly, and it is informed by more detailed work. But the environmental costs would seem to be a significant part of the cost. How could you be informed of the environmental costs when the EIS has not been completed?

Mr BETTS: The EIS will be completed before any government is asked to take an investment decision on raising the dam wall, but I will hand over to Ms Abood.

Ms ABOOD: As part of the work that we undertook as part of the options analysis, particularly looking at introducing a flood mitigation function, we looked at the social, environmental and cultural—it was a preliminary assessment. We were able to do a comparative analysis of the different options. I guess one of our overarching principles was to try to minimise the upstream impacts while achieving the primary objectives of reducing the risk to life and damages downstream. Obviously a much larger dam provides greater flood risk benefits downstream and reduces damages, but it also has much greater impacts. It was a trade-off in respect of looking at trying to minimise the impacts upstream, noting—I think this is really important—in a sense, flooding already happens upstream. All those important values, the flora and fauna and Aboriginal cultural heritage values that we all value are impacted by floods now. The impact of raising the dam for a flood mitigation, it extends the extent and duration of what happens in a flood now.

Mr JUSTIN FIELD: How often do you expect airspace in a raised dam to be utilised?

Ms ABOOD: The important thing is that the dam—if we have a raised dam, most of the time it will be operating as it is now.

Mr JUSTIN FIELD: I understand. That is why my question was specific. How often would the airspace be used?

Ms ABOOD: Only when there is a flood.

Mr JUSTIN FIELD: Clearly how often it would be used would inform the environmental costs and would underpin almost entirely your assumptions about the cost and benefit. It seems like a simple question that underpins a lot of the assumptions. How often would it be used?

Ms ABOOD: As part of the environmental impact assessment, that is a key part of the analysis. The EIS is fairly standard in terms of you go out and do your surveys across all those important things that have been identified in the standard secretary's environmental assessment requirements [SEARs] and then the impact assessment is trying to understand a probable event. We have not had a flood event since 1992. We are in a drought-dominated cycle at the moment. That will change.

Mr JUSTIN FIELD: So there has been no assumption in the cost-benefit analysis that has informed this document or what has gone to Cabinet about how often that airspace would likely be used and how often we would see temporary inundation of the national park.

Mr BETTS: No. Exactly the opposite is true. We have had to make probabilistic—

Mr JUSTIN FIELD: My question was simple, really.

Mr BETTS: Your question was simple, but you were not listening to the answer.

Mr JUSTIN FIELD: I was listening: It is an answer.

Mr BETTS: We are talking about low probability high-impact events here, which are intrinsically unpredictable.

Mr JUSTIN FIELD: I understand.

Mr BETTS: We can talk about things in the probabilistic terms around—

Mr JUSTIN FIELD: But that is what I am asking for.

Mr BETTS: We look at the range of possible flood events.

Mr JUSTIN FIELD: I have limited time. You are dancing around a pretty key question that goes right to the environmental consequences. How often would you expect? How often do your assumptions say you would expect that airspace to be used?

Ms ABOOD: Well, it is probabilistic. If it is one in 100, there is a 1 per cent chance of happening in one year. If you had a 100-year record, you would expect that once every 100 years. If you had it for—

Mr JUSTIN FIELD: But some of that airspace could be used for a much more frequent event. It would not only be used in a one in 100-year event.

Ms ABOOD: No. It could be used for one in five or one in 10 because that is a flood. We are mitigating that flood.

Mr JUSTIN FIELD: I understand. But that goes to the critical question. Mr Betts, you mentioned before that the legislation would create some statutory certainty.

Mr BETTS: Yes.

Mr JUSTIN FIELD: In actual fact, it does not far more than that. It asks the Parliament to put in place essentially how environmental impacts will be managed. It says how the environment Minister is to act and how the water Minister is to act. How will we expected to make decisions about the environmental management of a dam wall being raised when we have not seen the environmental impact statement [EIS] yet? We have not seen the information that fundamentally determines how often the area will be temporarily inundated.

Ms ABOOD: I guess, in terms of the environmental management plan, that will be informed by the outcomes of the environmental impact assessment and the planning approval. So the conditions of the planning approval will inform the environmental management plan. Currently there is concurrence with Water NSW because it is part of special lands as well, so there is concurrence between the Minister for the Environment and the Minister for water for their special lands. But under this, for a flood mitigation function, if we get the planning approvals from the State, the Commonwealth and the Government says yes, an environmental management plan will have to be in place. It would be informed by the conditions that come out of the EIS process and the conditions for approval.

Mr JUSTIN FIELD: I appreciate your answer, Ms Abood, but, with respect, I think that that is our job as legislators to set what conditions might be implemented or considered in an environmental management plan

because that is what happens at the moment under the national parks Act. It sets the parameters in which management plans are developed for our national parks. You are taking all of that power away, essentially, with this legislation and we are being asked to make decisions on it, or potentially to try to move amendments, without the fundamental environmental impact analysis that would be required to make decisions about that. Can you understand that that makes any legislative decision very, very difficult?

Mr BETTS: You are not being asked to take decisions now on the environmental management plan. The environmental management plan will be a product of the statutory planning process enacted by this Parliament being applied to this particular project and the conditions which are placed on the approval by the planning Minister acting independently under the relevant legislation, including the Commonwealth environment Minister.

Mr JUSTIN FIELD: In fact, no, we are not. It actually says in the legislation how the environment management plan drafting process would work. Let us be clear: Essentially, it writes a blank cheque to the environment Minister, but actually the veto powers of the water Minister, when you compare that to the national parks Act, set out very clearly what matters should be considered in the development of a management plan for our national parks.

Ms ABOOD: It would have to be consistent.

Mr JUSTIN FIELD: That is not in fact in the bill at all.

Ms ABOOD: In terms of the conditions that you would apply in the environmental management plan, it still has to be consistent because the Minister for the Environment is still responsible for the national parks Act.

The Hon. PENNY SHARPE: The Office of Environment and Heritage [OEH] is not here. I think they have had some experience with that.

Mr JUSTIN FIELD: No. This bill overrides entirely elements of the national park Act in respect to that national park.

Ms ABOOD: The land still remains national park. It does not change the status of the land. It just enables—

Mr JUSTIN FIELD: The management plan will be entirely overridden by this bill for that portion of land that would be temporarily inundated.

Ms ABOOD: We need to take that on notice, I think.

Mr JUSTIN FIELD: I have no further questions, Chair.

The Hon. PENNY SHARPE: Otherwise, why do you need to have a separate plan?

The CHAIR: The Committee is not taking questions on notice because of the truncated nature of this inquiry.

Mr JUSTIN FIELD: So we are not sure, really, how the bill will affect the management of the national park. That is what you are saying?

Ms ABOOD: I would like to have clarification from a legal person to be able to respond to that.

Mr JUSTIN FIELD: We have representatives of the Government here. The Government has put the legislation to Parliament. We do not really know how the legislation will impact the management of a World Heritage-listed national park.

Ms ABOOD: It is a legal question that needs to be, I guess, clarified.

Mr JUSTIN FIELD: Okay. I am able to cede my time to the Opposition—not to the Hon. Rick Colless.

The Hon. PENNY SHARPE: I am very happy to accept that. Is the Government planning a proposed advertising campaign in relation to the dam wall raising?

The Hon. RICK COLLESS: Have you run out of questions, mate?

Mr JUSTIN FIELD: It is my only question, mate.

Ms ABOOD: I am sorry?

The Hon. PENNY SHARPE: Is the Government proposing an advertising campaign in relation to the dam wall raising project?

Ms ABOOD: I am not sure.

Mr BETTS: The Government is planning a major community awareness campaign in relation to flood risk in the valley. This is one of the key findings of the strategy—that the current very low level of flood risk awareness, which is around—

Ms ABOOD: It is in its low twenties now, so there is 3 per cent of the population.

Mr BETTS: So only around 20 set of the population are fully aware.

The Hon. PENNY SHARPE: What is the nature of the advertising campaign?

Ms ABOOD: It is to increase awareness.

The Hon. PENNY SHARPE: No, no. What form is it taking? Is its television [TV]? Is it radio? Is it online? How much will it cost?

Ms ABOOD: It is a newsletter, basically.

The Hon. PENNY SHARPE: Is it a direct mail?

Ms ABOOD: It is distributed through the newspapers mainly. It is a newsletter. It was always planned as part of the progress of the status of where we are in the implementation of the strategy. The strategy is more than just raising the dam. The focus of this strategy is really about all those other things that we should be doing now in the short term to address the risk by changing how government does its business.

The Hon. PENNY SHARPE: When is it going out?

Ms ABOOD: This week, or last week.

Mr BETTS: It is imminent. It is a combination of direct mailing and so on, but also education in schools to raise awareness generally in the community.

The Hon. NATASHA MACLAREN-JONES: Our previous witness focused a lot more on water management. One of the proposals that has come forward is reducing the current storage level by 12 metres. I am interested to know, considering—I am not exactly sure of the figures—we rely quite heavily, around 80 per cent, on Warragamba Dam, how that reduction of the water level would impact? What is the impact of it?

Ms ABOOD: Okay. As part of the development of the strategy, we worked with the Department of Planning and Environment as part of the metro water planning process. When they were developing the plan we looked at all options in terms of how which you create flood mitigation. You can either raise the dam wall to create airspace or you can lower the water supply. We examined options where we lowered permanent water supply. As you correctly said, the Warragamba Dam provides about 80 per cent of Sydney's water storage. We looked at options of minus five and minus 12. Minus 12 is basically the lowest you can go in terms of the sill. Minus five is smaller. We wanted to understand the relative benefits.

Once again, when we are assessing an option for a flood mitigation function, we look at two things: Does it provide significant risk reduction in life? What does it do for damages? I guess because Warragamba is where the largest flows come out and it is a single point where you can actually influence and control the flows going down to the flood plain, that is really important because by mitigating the floods from Warragamba, you can delay the peak, which reduces the impacts downstream. It reduces the frequency and the time for which roads are cut off. It also means that properties are not impacted.

With a minus five—I will just make sure I get my numbers right here—that is approximately 360 billion litres of water from about 18 per cent of the storage. Minus 12 is a loss of about 40 per cent of the storage capacity of Warragamba and it is about 795 billion litres of water. That comes at a cost. They also have their own environmental cost as well. To make up that forgone water, there are different ways you can do that. You can obviously operate the desalination plant to its maximum capacity. But in the case of the minus 12, operating the desalination plant all the time would not be enough. You would have to bring other tranches of water on. You would either have to bring on other desalination plants or other significant investments in water. By lowering the water supply, it does come at its own costs as well. It does not perform as well. The minus five does not reduce the risk in the area that we really need to focus on where the property and lives are most at risk, whereas the minus 12 provides some moderate benefits but comes at a much greater cost and does not provide nearly the number of benefits that the 14-metre dam would raise.

Mr BETTS: So a 12-metre lowering of the water supply level would be a 40 per cent reduction in the dam's capacity. That would have a significant impact on water security for the Sydney region. We would need to

operate a desal plant at the maximum effective capacity at a cost of well over a billion dollars, we would need to build new desal plant capacity and we also suspect there would be very significant environmental impacts.

The Hon. NATASHA MACLAREN-JONES: First of all, have any costings been done on building additional desals? Also when would they realistically be able to come on line?

Ms ABOOD: If you went to a minus 12 now, you virtually have to make that investment now. For example, if we had already reduced the water supply by minus 12, our water storage would probably be down in the early 40s now, so we would have well and truly triggered—and we are in a drought at the moment. You would have to do it now if you were going to do that.

The Hon. NATASHA MACLAREN-JONES: If that were a solution to reduce it down to 12, what realistic time frame would it take to build additional desals to provide the water supply that is needed in Sydney? How many years would you be looking at to address this issue?

Mr BETTS: We would be speculating but eight years, something like that. We do not know.

The Hon. NATASHA MACLAREN-JONES: Okay. Thank you.

The Hon. RICK COLLESS: Thank you, Mr Chairman. Thank you, ladies and gentlemen, for coming in today. Can I explore the whole issue of floods, probable maximum floods [PMFs] and things like that? If we were to receive a PMF, does anyone have how much surcharge would be in the dam at a PMF now?

Mr GEORGE: I do not have that number on me at the moment.

Ms ABOOD: Are you talking about surcharge of the gates?

The Hon. RICK COLLESS: Surcharge in terms of how much the water level would rise is there was a PMF coming through the dam now. Would it be five metres or 10 metres over the spillway?

Ms ABOOD: It goes from 116 up to 142.

Mr CINQUE: I think about two metres over the dam.

The Hon. RICK COLLESS: Two metres over the spillway—

Ms ABOOD: But PMF—no, it is more than that.

The Hon. RICK COLLESS: —which means there would be a two-metre surcharge in the dam itself.

Mr BETTS: Yes, so we could talk about the levels of flooding that that would create downstream.

The Hon. RICK COLLESS: The water level in the dam itself would rise by two metres so there would be a two-metre inundation.

Ms ABOOD: No, actually a PMF would be higher than that. I do not have the exact numbers but it is metres.

The Hon. RICK COLLESS: If the proposed raising goes ahead, what would the flood storage capacity be above that full supply at 14 metres? How much water is stored in that top 14 metres?

Ms ABOOD: My colleague from WaterNSW—

Mr GEORGE: Sorry, again I might have the figures on me. I will have a look in my notes.

Mr BETTS: We might have to dig through some paperwork to find that answer for you, if we have it. It is the volume of water, assuming you are using the full airspace capacity.

Ms ABOOD: Yes. It is over 1,000 gigs, I think, so it is about—

The Hon. RICK COLLESS: Over 1,000 gigs.

Ms ABOOD: Yes. We would have to qualify that.

The Hon. RICK COLLESS: What I am getting at, of course, is that the minus 12 metre level, if we use that airspace, that is 800 gigalitres. So plus 14 would be a lot more than 800 gigalitres, would it not?

Ms ABOOD: It is not quite that simple. If you think about the valley and where the dam is, it is a V shape. The minus 12 does not give you as much because it is at the narrower part of the V shape. But even because of the sandstone gorge, and as you get wider you actually get more than what the 1,000 is. So it is really because of the shape of the geography of the gorge plus the dam raising.

Mr BETTS: So you have to drop the water supply availability very significantly to achieve a level of flood mitigation equivalent to raising the dam by 14 metres.

Mr GEORGE: To clarify, the 14 metre raising is 965 gigalitres.

The Hon. RICK COLLESS: Thank you. If we were to receive a PMF at the raised level, what would the retention time be for that flood water and how much is the peak delayed or reduced at, say, Windsor Bridge?

The CHAIR: Before you go on, for the benefit of Hansard, what is PMF?

The Hon. RICK COLLESS: Probably maximum flood.

Ms ABOOD: It is the worst possible flood that you could have. It is a catastrophic flood, a very, very rare event. For a 14-metre raising dam, currently if there was a PMF now it would probably last three to five days. If we had a PMF with a raised dam you would be extending that by probably up to an additional 10—probably at the PMF for a couple of days and it would drop and be elevated for about 10 to 14 days. Our objective is really to get the water out as quickly as possible so we would want to make sure that we evacuated that airspace as quickly as possible. So we are operating within a 10 to 14 day limit.

The Hon. RICK COLLESS: Do you have any figures using the 1867 flood as an estimated one in 500, I think, about how much that would have reduced the water level at Windsor, for example? I think the 1867 flood was 19 metres. How much would that be reduced at Windsor?

Ms ABOOD: It would have been reduced by about three to four metres. One of the critical things we have tried to do is because the most critical floods for us are between the one in 50 and the one in 1,000. It gets much harder to mitigate for those floods. We knock off for the PMF. We can reduce that by up to about two metres with a raised dam, but between the one in 50 and one in 1,000 we can reduce the peak levels, depending on the location in the flood plain. Some areas perform much better—you can get up to five metres and in some cases more. So it really depends where you are in the flood plain. But for the 1867 it was 19.6 so it would have—I will just quickly look it up for you and I will give you the exact number.

Mr CINQUE: I think it would be somewhere in the range of two to four metres.

Ms ABOOD: Yes, it definitely would be that. At Windsor it would be about 3.2 or 3.3 metres.

The Hon. RICK COLLESS: From an emergency services perspective then, Mr Cinque, what impact would that have in terms of evacuations and safety for the residents?

Mr CINQUE: I suppose what it does is delay the flood. Across the 20,000 modelled flood events there is up to around 10 hours or so extra forecasting time, but some of the more extreme floods that narrows down to about zero or maybe just a bit negative, but they are the really extreme ones. In most floods there will be an increased warning time by about 10 hours or so, but it decreases—

The Hon. RICK COLLESS: Which is critical for evacuations.

Mr CINQUE: It is critical for evacuation to provide more capacity for the existing population. The other effect of the dam is to reduce the probability, so we will have to do evacuations less often. For any particular height, the flood will reach the same height, but reaching that height will be less probable. So they are the two main benefits for us: less frequent evacuations and more forecasting time in most floods, but then in some floods there may not be more forecasting time.

The Hon. RICK COLLESS: From a community safety perspective that is really important, is it?

Mr CINQUE: Yes, that is right. As part of the suite of options, this is an important one to reduce that frequency of evacuation, give us more time, and if we do that in conjunction with the non-infrastructure options—land use planning, increased warning time and community engagement—all of those factors together can help to dramatically reduce the risk of loss of life.

The Hon. RICK COLLESS: Thank you. That is all the questions I have.

The CHAIR: I am glad to hear a bit more about the topography of the land in that area. Would we be able to get a bit more of an explanation around what would happen in the Hawkesbury-Nepean valleys if there was to be a flood of a magnitude similar to what Brisbane faced in 2011? What would happen to the community there? Where would the water go? How would it look?

Ms ABOOD: I might start off and I will hand over to Mr Cinque. If we had a flood similar to Brisbane, which is like a one in 100 flood event, that would require about 64,000 people needing to be evacuated, about 5,000 houses would be impacted and it would cost around $2 billion.

What would happen with that sort of flood? Most of the urban settlements like Windsor, Richmond, McGraths Hill, Pitt Town are all located on a flood island. On the flood plain there are lots of low points. I guess where the roads have been developed—so there are lots of low points in the road—they get cut off early in the flood process. If we had a flood like that it would mean we would have to get all those populations out before the major roads were cut and that would be the Hawkesbury Valley Way, Windsor Road, George Street and Richmond Road. We would have to make sure that the populations were evacuated because it may be predicted from an east coast low we think it is going to reach a particular height, but it might be worse than what was anticipated, you cannot leave people in their own sheltering place. So you have to evacuate all those populations on those islands because there is risk of total submergence if the event is much worse than what is predicted.

It is really important because what we have got to do is then get the population out of the flood plain to ensure that people are not going to be either trapped on the road somewhere or submerged. Usually with the east coast lows it is generally inclement, like the weather today. For example, in 1867 when it was classified as a one in a 500 year flood, there were reports of six metre waves. It is like an inland sea and you would have these huge waves, it is very windy, lots of debris, trees everything coming down. Water would be contaminated from that. And you imagine it now it would have all the on-site sewerage, the sewers and that would be very contaminated. So you have to get people out for a whole range of reasons.

Mr CINQUE: In that one-in-100 scenario, in Penrith because the flood plain level has not changed much over the decades, flooding starts around about one-in-50 to one-in-a-100 so there would be a lot less impact in that flood basin. The significant impact would be down at Hawkesbury and, as Ms Abood said, Windsor would be isolated and cut off with no power and other services. That would require an evacuation. The same with Pitt Town and McGraths Hill. Part of Bligh Park would be affected, the eastern part, and Richmond would not be affected. Down the South Creek catchment, as it backs up along there through Riverstone and Marsden Park and Schofields down towards Blacktown there will be significant numbers of people.

The total number of people we would evacuate is about 64,000 so it would be quite a large operation. In the Hawkesbury area there is a much bigger impact because the flood plain level has changed over the past 60 years through better science so there is some legacy development. It rises sharply about one-in-10, one-in-20 flooding. After one-in-a-100 it has spectacularly more effect and rises pretty rapidly in the Penrith flood basin.

The CHAIR: Ms Abood, you mentioned a rough figure of $2 billion damage, so to speak, to assets. What is the current impact from insurance premiums? Has the Insurance Council been a part of this process?

Ms ABOOD: We have been working with the Insurance Council of Australia. In terms of the question about the 75 per cent, I guess we double checked out numbers against with the Insurance Council of Australia and it came up with, I think, it was a 1 per cent difference in terms of the numbers. So they are mainly direct numbers. They are fairly conservative numbers. I guess, when you are looking at these sorts of things in terms of damages, there are also intangible costs—the emotional and the social costs associated with that. I guess the real cost, whilst $2 billion is really like property damage and impact on utilities, the real cost would be much higher than that.

The CHAIR: Some people have touted that we could look at more road routes for evacuation purposes as a way of mitigating the risk. What kind of work has been undertaken to rule that out as an option which leads you to us talking about the dam wall instead?

Ms ABOOD: As part of the work we have undertaken, as I said, the two primary objectives were to reduce risk to life and to damages. Our evaluation framework was designed around that and we had scenario planning where we looked at a whole range of road packages—and I will hand over to Mr Langford in a minute—looking at what do roads contribute to the reduction and risk to life? What do other flood mitigation measures such as dams contribute to risk to life as well?

We had a purpose-built evacuation model built which was an agent-based model which basically models every vehicle and how that would perform. So based on the evacuation plan we have modelled that in terms of when people might be isolated because roads are cut off, looking at the capacity assuming that they would 100 per cent comply with the evacuation orders. We have done a lot of work. We did over 13,000 model runs to try to assess the relative benefits of all of those. Roads are important but, I guess, when you are looking at it from a resilience perspective, these are low probability events that have high consequence. So when you are looking at it from an economic and a discount rate they do not stack up as well as, I guess, average annual damages.

The CHAIR: Yes, they are black swans.

Mr LANGFORD: As part of the task force that informed the flood strategy we, as Ms Abood said, developed an agent based model that was peer reviewed and was essentially best practise world-wide in how we modelled the significant risk and evaluating how to evacuate people out. We have already got a regional evacuation network in the flood plain. The challenge we have with the existing road network, the likes of the Northern Road, Londonderry Road, Richmond Road, Windsor Road is that the modelling demonstrated that evacuation is constrained by capacity of the road network itself. We looked at over 10 packages of actually worked up strategic designs of road upgrades across the whole flood plain to try to see if that was a better option than the dam.

As part of the evacuation modelling we modelled numerous scenarios, into the thousands, that included options with reduced water levels in the dam, the raising of the dam, combinations of dam raising, water reduction, stand-alone roads packages as well and then roads in combination with those other infrastructure options. At every point it proved that the significant cost in road upgrades did not come near the benefit that the dam raising has shown. For the 1867 flood around the one-in-500 flood, with our population forecasts out to 2041, with over a $1 billion worth of road upgrades we could only reduce the number of vehicles that were left isolated—so risk to life—by about half. When you raise the dam by 14 metres that risk was essentially negligible. So you could not take away risk to life with just the roads alone.

We looked at raising the low points of the roads. We looked at capacity increase in roads. We looked at combinations of them. We looked at the proposed Castlereagh connection freeway into that flood plain. Time and time again they did not give you the benefit that the dam raising does. But one of the key things as part of the strategy is that this is a multi-faceted approach to reduce risk to life. There is some key local road networks that have flash flooding just with normal rain events. As part of phase one of the strategy we are actively progressing the development of package of works to address those local issues. You still need to evacuate people so we still need those road upgrades.

The Hon. JOHN GRAHAM: My question is to Planning about Penrith Lakes. Given your statement about the State environmental planning policy limited development to 30 houses, can you guarantee that there will be no more than 30 dwellings on the Penrith Lakes site in perpetuity?

Mr WHITWORTH: I cannot guarantee that in perpetuity.

The Hon. JOHN GRAHAM: One of the reasons you cannot is because of this unzoned land, is it not?

Mr WHITWORTH: No, one of the—

The Hon. JOHN GRAHAM: Can you rule out any development on that unzoned land?

Mr WHITWORTH: It is not appropriate for me to rule in or rule out development. What I can tell you—

The Hon. JOHN GRAHAM: How many houses are proposed at the moment for development on that unzoned land?

Mr WHITWORTH: The Department of Planning and Environment does not have a plan for any development on that unzoned land, other than—

The Hon. JOHN GRAHAM: We have taken evidence today—

Mr BETTS: Will you please just let him finish? You cannot ask a question and then talk over the witness.

Mr WHITWORTH: We do not have a plan other than—this is a difficult area for me to answer because it goes to the heart of the conversation—

The Hon. JOHN GRAHAM: I did not ask about your plan.

Mr WHITWORTH: It goes to the heart of the conversations going with Penrith Lakes Development Corporation. That is why it is very difficult. We have ruled out with Penrith Lakes Development Corporation their proposal for 4,900. Penrith Lakes Development Corporation are still seeking development, trying to bring it down to numbers such as 1,800 and 1,500 and 800. We have said to them that our modelling does not support that. Our modelling that Mr Langford has just described only supports a handful more dwellings of a similar nature to what has already been approved under that SEPP on that site.

The Hon. JOHN GRAHAM: Planning has refused these applications in the past. Is that the view you are likely to take, refusing these sorts of developments because of these flood plain risks?

Mr WHITWORTH: Yes. Based on the evidence that we have, yes.

The Hon. JOHN GRAHAM: The SES would support that approach? Given what we have heard, you would hate to see a development of that scale that has been put to the Committee today. We are not speculating about this; it has been put to us in evidence today. You would be concerned about a significant—

Mr CINQUE: We support that on the basis of the evidence of the modelling that has been done which shows a very significant risk once you go above those 30 properties. We would support that.

The Hon. JOHN GRAHAM: Mr Betts, a question that goes to the heart of this document: Why have you not questioned that assumption about the number of people who are moving on to this flood plain?

Mr BETTS: We precisely have.

The Hon. JOHN GRAHAM: I know you have done detailed analysis and I accept that, but it just looks like that assumption underpins all this.

Mr BETTS: When we were undertaking the analysis for the strategy we started off with an analysis of what population growth could occur in the valley under land use settings as they currently existed with a view to testing out the exposures that created and the risks that created for the community. The upshot was a combination of infrastructure responses, like the road upgrades that Mr Langford has described and like the raising of the Warragamba Dam, and non-infrastructure responses, critical among them being the tightening of the planning controls that Mr Whitworth has described. For the first time, because of the work that Ms Abood and her team have done, we have a proper understanding of flood risk in the valley and are able to build that into land use planning decisions. Successive governments on both sides of politics have allowed development to occur in the valley without taking account of the significant life and property risks associated with flooding and we are now dealing with that.

The Hon. JOHN GRAHAM: Let me put it this way: Would you be comfortable if that population did double? Given you are now saying the plan is to drive that down using planning policy, you would like to see that much, much lower, would you not?

Mr BETTS: I think Mr Whitworth has adequately answered that question. Clearly, growth on that scale cannot occur given what we now know about the flood risks in the valley and the planning system will be adapted to reflect that flood risk information that is being—

The Hon. JOHN GRAHAM: What is an appropriate number?

The Hon. RICK COLLESS: How long is a piece of string?

The Hon. PENNY SHARPE: No, they say they have got evidence.

Mr JUSTIN FIELD: Should the dam wall raising be given planning approval, will environmental offsets be required?

Ms ABOOD: That is part of the environmental impact assessment and part of mitigation action. It is compliant with what we are looking at, so environmental offsets are certainly part of the equation.

Mr JUSTIN FIELD: Under planning law, would there not be environmental offsets required?

Mr BETTS: That would be part of the planning decision that would be made by the planning Minister at the end, the extent of those offsets.

Mr JUSTIN FIELD: It has been raised with me that Infrastructure NSW is lobbying government departments, the Office of Environment and Heritage and others, to try to advocate against environmental offsets being required. Is that the case?

Ms ABOOD: That is not true.

Mr JUSTIN FIELD: That is not true?

Ms ABOOD: No.

Mr BETTS: It is completely untrue.

Ms ABOOD: We are just questioning I guess in terms of—the environmental impact assessment, as I said before, the normal understanding of the baseline information and what is out there, that is fairly standard.

Mr JUSTIN FIELD: You said "we are just questioning"?

Ms ABOOD: In terms of the impact assessment, one of the complexities around the EIS for a flood mitigation function is when you actually try to ascertain the impact of flood mitigation of these probabilistic floods on those values. It is the appropriateness of the methodology that is being applied. Traditionally with the biodiversity offsets, it is much easier when you are looking at a normal infrastructure—

Mr JUSTIN FIELD: A coalmine destroying a forest, yes.

Ms ABOOD: No, I was not going to—

Mr JUSTIN FIELD: I understand the point.

Ms ABOOD: A road going through, because you could say you are removing those values.

Mr BETTS: We are simply saying that absolutely it will be for the planning Minister to determine what offsets are appropriate but that is a somewhat more complex task than when you are simply building a road because your estimation of what the impact will be on environmental values depends on judgements around low-probability, high-impact events, which is just intrinsically complicated. But that is not a matter of lobbying anybody to do anything. That is just a truth.

Mr JUSTIN FIELD: I understand, but surely the offsets required could add a substantial cost to this proposal. How do you make even a general cost-benefit analysis without understanding how much land you may have to acquire to offset the impact?

Mr BETTS: That is why we do the EIS before we do the business case, so that any future government is able to understand fully the costs associated with environmental mitigation measures before they take an investment decision.

Mr JUSTIN FIELD: Hang on a second. Your summary document outlines the costs assumed for the raising of the dam wall. How much of the cost assumed is offset cost?

Mr BETTS: This is a high level estimate of the cost. It will all be subject to—

Mr JUSTIN FIELD: How much is the high level estimate of the offset cost?

Ms ABOOD: The cost will obviously be informed through the EIS process and the offsets. As Mr Betts said before, the reason why we are doing the EIS first now before it goes to a decision or an approval process—a lot of the other decision processes make the decision and I guess the EIS comes after, but we are aware of the impacts. We are trying to put best practice here and an evidence-based process to make sure that we have done this properly. It is very difficult, we all know, to assign a cost to environmental values because it is very difficult to ascertain specific impacts and put a cost on ecosystem services and the important cultural heritage values.

Mr JUSTIN FIELD: We agree that is hard to do.

Ms ABOOD: It is a real challenge. All we are saying here is that we want to review the methodology to make sure it is appropriate for what we are trying to assess.

The CHAIR: Thank you for making yourselves available this afternoon. There are no questions on notice.

(The witnesses withdrew)

(The Committee adjourned at 5.01 p.m.)