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Before:	Commissioner Wasley (Chair) Commissioner Lovell Commissioner Knott
Witness:	Dr Stuart Parsons - bat ecology

COMMISSIONER WASLEY: Okay, we will reconvene. Mr Makgill.

MR MAKGILL: Thank you, sir. I would like to call our final witness, Dr Stuart Parsons, on bat ecology.

COMMISSIONER WASLEY: Thank you. Welcome, Dr Parsons. We have your evidence and reply statement in front of us. Thank you.

DR PARSONS: To begin with, I was wanting to highlight to you in one or two diagrams the extent of mitigation that has been proposed by the applicant, to try and put it together for you in one place so that you can see that and then perhaps refer to that as I go through and give my presentation to you. That's up on the screen, I believe. You've got it there. I hope it's clearer than the one that's up on the screen.

Really, this brings together all of the mitigation for the bats that has been proposed. There are some slight tweaks to this, which I will take you through. But a couple of things that I understand that have been raised before you in the past week or so, and that I'd like to cover off as well.

So you can see in pink, in particular, and for the people that can't see - it's much harder in the distance than up here -

this is actually the extent of the lot deferrals that have been proposed. So they really stand at the edge of the development on that critical riparian strip going from north to south. Those lots have been deferred until the vegetation reaches sufficient height and canopy enclosure. So that's really the critical point of that. There's not a particular time. There is an effectiveness of that strip.

I understand as well that there's been some questions about the east-west shelterbelt, which for everyone else is just here, versus the southern galley, as in either/or in terms of mitigation. I just wanted to highlight for you this plan that it is not actually an either/or, it is both. So both of those have been proposed for mitigation. So the east-west shelterbelt, I'm sure you know by now, that that was proposed there and the lot deferrals around it but also the replanting of that gully to provide additional habitat and potentially a link through to the gully system, to the west.

The planting is going to happen early, as early as possible. There are some questions still about the sourcing of plants and our ability to source sufficient plants in time. But as well, the proposal is that the development, particularly in the northern parts of the east-west shelterbelt, going from

there to the north, will actually occur going from west to east. Therefore, as it progresses from west to east towards that riparian area it gives the plants more time to actually develop.

One of the other things I wanted to highlight, which I think you've just been given diagrams of, is this picture doesn't actually show the entirety of what's also been proposed and it will have a positive impact for the bats. There's also landscape concepts for trees. The one I've presented to you is particularly for Knoll Park, as an example. This is the diagram, Knoll Park Landscape Concept. This highlights the trees within Knoll Park that are going to be retained, but also the additional planting of trees that are going to occur in that area. So it's not just reliant on what's up on the screen there. There's also significant planting occurring within those parks and recreation areas, this is an example.

The final diagram that I just wanted to highlight to you is the Streetscape Planting Strategy as well, which is this one. Which I think you have a copy of as well. This highlights actually where trees are going to be planted along the streets. So there's a significant amount of planting that's going to go along the streetscape in addition to what's shown up on that diagram.

So when you take this in its entirety, we have this plan for the mitigation but we also have additional features that are being added, which I think will be beneficial to the bats.

I'm happy, it probably is better towards the end if you have any questions about that, I'd be happy to answer.

If it's okay, I would like to just go through some key points. It loosely follows my evidence-in-reply. But there's some information in there that I think would be relevant as well.

I'm sorry, just before -- and one thing that's really difficult to see in this diagram is there's a blue line that travels in front of the deferred lots into the northern sector. That's additional berm planting as well. So these are going to be relatively large stature trees. So these will provide additional screening, in addition to what's happening on the eastern side of the road for protection against lights that are coming from those houses. That's something that may have been missed as people have gone through. I certainly missed it early on, as I've gone through it.

Just following on from that plantings. Long-tailed bats are known to use a variety of tree types for roosts, especially in highly modified landscapes. For example, in the AECOM statement, which I'm sure you're well aware of now, 80 per cent of the trees in that study where they found bats were actually exotic trees. In addition to that, 82 per cent of the roosts that Andrea Dekrout found as part of her PhD in the late 2000s were also exotic trees, and the only two maternity roosts that she found were actually in oaks and those were at the end of the runway. I can't remember the name of the area; just towards the northern end of the runway at Hamilton Airport.

This fits in very nicely with the planting plan that's been proposed by the applicant, which is a mixture of exotic trees and native trees. The exotics offer an advantage in that they're faster growing and also they will form cavities earlier than many native trees. I understand that for the natives a timeframe of 80 to 90 years has been proposed in terms of maturity and hold formation. The advice I have from the tree specialists - I'm not a tree specialist - is about 30 to 50 years for the exotic trees.

The mixture of exotic and natives in these plantings is quite deliberate and deliberate as a mitigation in terms of

providing roosting habitat for bats at an early as possible stage.

Utilisation of the Amberfield site. So the acoustic surveys of radio-tracking by AECOM has given us good data and a very good picture of how the bats are using the development site., also for the relevant experts to draw conclusions on the importance of site features and the level of effect on bats. The data collected also agrees with the published literature and reports. So scientific studies that occur in the Hamilton area and in other parts of the country but also in multiple reports that have been commissioned by different groups. That gives us confidence and demonstrates the quality of the information that's been collected.

Much discussion, I think, has occurred regarding the outcomes of the AECOM study. I, for one, would like to applaud their efforts. Capturing the radio-tracking on long-tailed bats is a challenge in any environment, particularly a highly fragmented one, such as this, and I think they've done a superb job.

I would also urge caution in the interpretation of those results. Outcomes of tracking studies can outwardly appear to

be quite simple. Their interpretation takes quite a deal of skill and expertise. In my opinion, the most relevant data are the actual fixes, which is as an annexure to my evidence-in-reply, as well as the core areas. I would not put store really in terms of detail of understanding what the bats are doing in the broader home ranges.

The cause of the fixes clearly show that the bats are not using the majority of the Amberfield site. It's also worth noting, I think, that only males record, and this is an interesting trend. AECOM only managed to catch male bats at Hammond Bush. This mirrors the outcome of Andrea Dekrout's PhD where she caught and radio-tracked 11 bats and only one of them was female, and they were caught at Hammond Bush. She speculated that actually the bias from females to males in that study and in her capture, she thought was a reflection of the poor quality of roosting sites that were available to the bats in that area.

I heard with great interest, the previous submitters talking about the fact that there may be multiple bats using roost boxes in Hammond Park. I'd love to see more detail of that. To me that reinforces the lack of quality natural roosts

for females in that area and if the roost boxes are providing that, then I think that's tremendous.

But it is also reflected in the fact that only two male bats were caught and radio-tracked and certainly one of them was found in tree roosts on the Amberfield site.

In terms of pasture. It's my opinion that the most important features are the important features of the development site at the riparian margin and the east-west shelterbelt. Both are linear features for bat navigation. Bats like to use linear features of the landscape to move around. Many species of bats, including long-tailed bats, don't particularly like to move over large areas of open ground. Large areas of open ground subject them to wind, which is energetically more costly for them to fly. It exposes them to predation as well because there's very little cover. Generally, there's no food available for them in those habitats.

Pasture doesn't provide protection from wind, it doesn't provide the insect accumulations. We know from studies that the top edges of canopies have got accumulations of insects and the bats are actually exploiting those beneath hedge species, and that doesn't exist in the pasture.

This is also reflected in the studies that show that the bats under-utilise its habitat type. So I've provided for you in my annexure a graph from Andrea Dekrout's PhD thesis.

MR MAKGILL: Stuart, sorry, you are referring to annexures. It would probably help them to identify if you mention what you are referring to.

DR PARSONS: No problem at all.

MR MAKGILL: I do apologise but I think it would be helpful.

DR PARSONS: There we are. So that's the annexure. In essence, what this is showing is the availability of habitat to the bats compared with how they are actually using it. So if bats are using habitat in a proportion that is available to them then that shows it's more or less sort of a random thing. They're just moving through it, they're not particularly bothered. If they use habitat in greater proportion to its availability it shows that they have a preference for it. They're seeking it out. They're spending more time in that area than the area represents as a whole.

The flip side of that is the area that is available but the bats do not spend much time in that, and this from radio-tracking studies. You can see from the pasture, it's the only one that's statistically significantly under-utilised by the bats.

A simple way of putting this is it appears that they avoid habitat type, their preference for the gullies and the riparian strips, I think everyone agrees from the literature and the studies, that's the case for these bats. The Crewther and Parsons statistical model that's been talked about in people's evidence and evidence-in-reply also highlights this in that bat activity decreases as you move away from vegetation or moves away from gullies. Essentially, if you're moving away from vegetation you're likely moving to open space and that activity drops substantially as you move away. This fits into the fact that these are edge animals. They like to forage on edges and move along edges and use linear features as they go.

This can actually create some challenges when you're interpreting radio-tracking studies because what might appear to be the use of pasture is actually the use of a pasture edge. So when people are interpreting these, I think the AECOM study has made an attempt at this, is that because a bat is recorded over

what is called pasture you have to look at what it's on the edge of. Is it on the edge of an urban area, is it on the edge of forest, is it on the edge of a shelterbelt?

Urban landscapes. So several studies have shown that the bats avoid urban landscapes. This is my last point. I want to just look at the detail of the results to understand it. What this means, particularly what this means in Hamilton, there are several hotspot areas for bats in Hamilton that are found on urban areas; this includes Sandford Park, Te Anau Park and Fitzroy Park. Other areas such as the Mangakotukutuku Gully and Hammond Bush are also surrounded by urban areas. Also you have to acknowledge that each also has access to key features of the landscape, including gullies and the river.

That is likely a contributing factor to the fact that the bats are in that area. But they are still in areas that bound urban environments. This meets the pattern exactly of what is happening in Amberfield. As it currently stands, it's paddocks, parcellated trees with a riparian margin. But even should the development go ahead it represents an urban area on the edge of a significant feature for that, that being the river and the riparian strip. This mirrors where we're seeing bat activity in the long areas within the Hamilton area.

In terms of adaptive management, I wanted to make just a few points regarding the proposed use of adaptive management, particularly to highlight our assessment of effects versus the baseline data that might be used for an adaptive management approach.

As we presented in evidence, it's also mirrored in the consent conditions, we don't seek to adaptively manage the development. We seek to mitigate any residual effects. It's our position that there are no residual effects. What we seek to address with adaptive management is the risk of an effect. I think you have probably heard from a lot of people about areas where we lack specific information about the biology, the ecology and behaviour of bats, and this is a worldwide phenomenon.

We also don't assert that we have sufficient data for the baseline for adaptive management. What we assert is that we have sufficient data to measure and mitigate all the effects of the development. I think that is a really important point. We've never said that we have -- the surveys that have happened have been AECOM that we have sufficient data for the baseline for adaptive management.

In fact, in the annexure of my evidence there are some suggestions about how we might deal with adaptive management and potential triggers although I would like to come talk about lighting in a little while.

But we do acknowledge that should adaptive management be the approach that's taken, baseline data is required. It needs to be a very specifically designed study to address changes in the use of the site by the bats and what is causing that. That needs to happen prior to development, during development and post development. That has been an approach that has been adopted in a number of projects within the Waikato region, particularly around the Waikato Expressway where pre, during and post surveys are required. Certainly the later ones are statistically robust with our analysis ability to detect change. So they should be able to actually quantify the change in the population, whether it be -- or inactivity of a population, whether it be positive, negative or neutral within certain boundaries.

In terms of light - a number of 0.1 lux - people have been discussing that light is likely the most uncertain effect on the bats. I think there is potential for that. I do not disagree

with it. I would like to know more and discuss it more with submitters in caucusing. The level of 0.1 lux has been suggested and even in my evidence in reply I agree with Georgia Cummings' assessment that 0.5 lux would be more appropriate. Yesterday I believe we had some advice from a lighting specialist that called into question the ability to actually measure light levels when they are so low and I think that we need to, along with submitters, perhaps in caucusing this afternoon, discuss with them an approach that might be better than setting such low light levels.

One thing that we have discussed as a team there is perhaps to do studies within Hamilton, looking at areas where there is high bat activity, medium and low bat activity measuring light levels and seeing if we can calculate what might be important levels for us to use as triggers and then to discuss the appropriate adaptive management.

I can also say that there are options for controlling light emission from the deferred lots along the edge and the memo from the lighting specialist says that this is quite complicated to adjust the lighting or to control the light and how it can be emitted from housing in sensitive areas. So that is something

we will bring along to the caucusing this afternoon. I can read that memo to you, if you'd like, or we can just supply it.

MR MAKGILL: Has it been ...?

DR PARSONS: It hasn't been supplied so we can supply that to you. It is very, very helpful I think for everybody.

Finally, I just wanted to highlight some things from the Crewther and Parsons model. So this has been cited by people's evidence. This is the predicted model of bat distributions. It's not in the annexure to my evidence but it's been in a number of people's evidence. Essentially what it does is it looks at where bats have been found using acoustic surveys and it uses a statistical model to correlate that with other aspects of the environment. So that might be topographical complexity, so how hilly and ridgy is it? Distance to vegetation. Distance to lighting. From that it tries to tell you that one of the important features for predicting the distribution of bats, and it also provides a heat map of where you might also find suitable habitat.

As with all models, I think they say always informative but never correct, so you always need to take that into account.

The thing I wanted to highlight particularly, two points, was that model has been cited as justification for having a 100-metre vegetation strip in certain places, particularly the north-east terrace. I believe that was in Mr Kessels' section 42A, and it's been repeated in several other people's. I think that's a misunderstanding or misinterpretation of what the model says. The model never measures the width of vegetation. It's purely a desktop exercise and the model has a 50-metre resolution. So to be able to do that it's very, very challenging.

What the model says is that bat activity decreases significantly as you move away from vegetation and 100 metres is a reasonable distance to say that bat activity has declined significantly 100 metres away from vegetation. So the 100 metres is not the width of the vegetation. It's the distance from vegetation where you get the decline in bat activity. I think that's an important point to make because the model makes no attempt to justify or to suggest how wide any vegetation should be.

Just from a clarity point of view, there's been some suggestions about using the same distance information about street lighting. I think the relationship to the model shows

the area's quite complex and, to be honest, I think it's highly unreliable. I certainly wouldn't be using it. What it shows is that bat activity decreases as you move away from lighting and then starts to increase. I think this is probably a bias and this is highlighted in a report that this is probably just a bias that's been brought into the model from where people choose to do these studies. I would go probably beyond exercising caution in using that light information and to say that it should probably not be used at all.

That's really the things that I have to cover. If you have any questions I'd be more than happy to answer them.

COMMISSIONER WASLEY: Thank you, Dr Parsons. There are some questions. Commissioner Knott.

COMMISSIONER KNOTT: Thank you for that. That was useful to run through those. I have a number of questions which have arisen from your evidence-in-chief and also reply. But top of my pile of questions, I suppose, is the fact that you appreciate over the past couple of weeks or so we have learnt an awful lot about bats and I think the difference I felt reading both your evidence-in-chief and your reply was that you were shown the competence that others would show in terms of predicting what

might happen, I suppose. I suppose that bit comes down to our role as commissioners. We clearly have to hear all the evidence and balance the evidence and see who we best trust, I suppose, moving forward and I think it slightly different here because we have caucusing and we are going to have some joint views hopefully coming forward from that.

Sort of picking up on that and picking up on some of the things that you say, only for instance you recognise there isn't an awful lot of survey information yet, there needs to be more. I thought from reading your evidence-in-chief, I think it was, really you did rely upon the model, which you tested elsewhere, and using the model here to actually predict things but now you tell us that the models are always informative but never correct. I suppose really, in a simple question: why should we trust you rather than any other expert we have heard from? That will then lead to my other question.

DR PARSONS: I think the difference between what I have put forward and the others is a matter of clarity of what people are saying, in part. So for example, the amount of data that's available and me saying that it's sufficient or not sufficient. So where I say the data we have is sufficient, in fact I think it's very, very good; all of the cases like this that I've ever

worked on, this is the most data that I've seen brought to a commission hearing.

We have sufficient data to determine the effects. So what would happen, should the development go ahead and how do we mitigate for that?

Where I've stated, and I think this is where it's become grey, what I've stated we don't have sufficient information is for the baseline for adaptive management. I think that's a very important point that needs to be made. We acknowledge that should adaptive management go ahead there is a requirement for people to go and collect the bat baseline data and it's different. The design of how you would do the acoustics, so bigger effects versus how you would do it for adaptive management that could go for 15 years, is very different. And I think the way that the effects surveys have been done is industry standard. We have several studies that we can draw on, particularly around the Waikato Expressway, for how baseline data for adaptive management should be done.

So I think that's a really important point, is that it might appear confusing or contradictory but it's not. We have sufficient data. In fact, many of the submitters have been

quite open about saying that the level of unmitigated effect, and I don't think there's been a huge amount of disagreement. Should it go unmitigated it would be high. So I think that information has allowed people to form those opinions and to understand that the riparian strip is important, that the east-west shelterbelt is important.

COMMISSIONER KNOTT: So in respect of the use of the predicted model or otherwise, you are confident that there is enough data there to get an effect?

DR PARSONS: Predicted model, if you look at it for the Amberfield site, it does not identify important areas there. It's pretty empty. I think there's one or two hotspots in areas there. So the predictive model agrees with, in terms of what's important on the site, because I think it does highlight some riparian areas. But you have to take all the evidence as a whole, all the information available. But the other thing that's really important to this is to apply the scientific understanding of what's going on. To simply take a model and apply it and say one area is this, one area is that, pasture is important. Pasture is not important. You have to understand the biology and the ecology of the animal, how it uses those

landscapes and apply that expert knowledge. You can't do it outside of that otherwise it can be very misleading.

COMMISSIONER KNOTT: So having gone through that one, I have some other questions, as I said, about your evidence-in-chief, and I suppose that is really tying up -- you talk in paragraph 55 that you think:

> "The value of Amberfield to the long-tailed bats is as a corridor that facilitates movement of bats between gully systems and the river."

I think that really links back to that question about pasture and the role of pasture. Fortunately we have still got it on the screen, annexure F, from your reply.

For me, trying to understand how the bats operate, clearly we heard that they spend quite a significant amount of time roosting so I presume those areas where they roost would then be those which have the nice tall lines on annexure F on the habitat proportion in the core areas. For instance, gully habitat is shown to being important in the core areas but I presume the time they spend flying from one -- as I understand it, they may fly from one core area to another, for instance. But they are not spending much time with any one part of that

because they are travelling, I presume, rather than being sedentary. Does that not then call into question the reliability of what we see as F? Do you understand my logic?

DR PARSONS: Yes.

COMMISSIONER KNOTT: Because they are not stopped and they are not living there, they are just passing through that, so does not F underplay the significance of the land which uses linkages because it seems to me, having heard the other evidence, that the linkage is as important as where they roost, in a way, because they have to get between places?

DR PARSONS: I will go back to the beginning of what that diagram shows. That diagram does not show necessarily where they are roosting. So this is why they are being radio-tracked; it is generally when they are moving. It is showing areas they are using now. The reason why I say sort of "not exactly" is because areas where they have high use could also be areas where they are roosting, such as gullies.

You can't necessarily separate those two things but the radio-tracking, this is looking at areas that the bats are in when a radio-tracking fixes in.

The biology of the bats and the behaviour of bats is that they'll leave a roost, they may go and drink. They will forage a little bit locally and, then depending on the species, they'll move from area to area that has good foraging for them. It does not mean they won't forage on the way, of course if you find some food on the way you'll use it. And an area, as they're moving from area to area, could actually be a stopping off point.

I think what we're seeing here is the habitat that they're using while they're on the move but there is an association most likely with where they are roosting as well.

The fact that they're under-utilising pasture means that when they're moving through the landscape they are avoiding -- in a simple way they are avoiding moving through the pasture. They are using the gullies, they are using the river. That's for food, it's for -- because insects will be in there. It's a much more stable environment, protected from wind, and it provides a linear feature. We know how bats actually navigate as they move from one area to another and linear features and objects that they recognise in the environment are important parts of that.

In my evidence, what I'm really pointing to is the fact that the riparian strip, the east-west shelterbelt, I would think we've got feeding calls, which is an attempt to feed, in that riparian area and some other areas, including ours is some level of feeding. But they're moving as well from probably, and this is a little bit of speculation, from that eastern side of the gullies through to Hammond Park, across the river, using the riparian strip for the reasons that I've said, and they're probably heading to the west to Mangakotukutuku Gully and the quickest way to do that with vegetation cover, protection from predators and wind is using the east-west shelterbelt.

COMMISSIONER KNOTT: That takes me on to the question about the east-west shelterbelt, which follows the logic. Firstly, just to get some clarity over the plan which we were given this morning. I am just double-checking this because I was trying to work out which -- and it made me - the fact that I do need new glasses so forgive me if I have missed it - existing trees. If you look at the specimen trees large, which I presume the shelterbelt is mainly specimen trees large, and it says, "Note: cross denotes existing".

DR PARSONS: Sorry, could you repeat that?

COMMISSIONER KNOTT: Sorry, it says on the plan:

> "Specimen tree large, exotic and deciduous. Note: cross denotes existing".

DR PARSONS: Someone had to point this out to me as well.

COMMISSIONER KNOTT: I cannot spot the crosses.

DR PARSONS: So a good example of that is in the north-west point of the site. You can see there, and not clear - I'll concede that - north-east side you can see there's a number of trees overlapping there and they have a small black cross in them. So those are existing trees. Ones without a black cross in them ...

COMMISSIONER KNOTT: So in terms of the east-west shelterbelt, I am trying to look at the cross on these, so is there a cross on there confirming all the layers of existing trees there? That is what I assume was intended.

DR PARSONS: That is a good point.

COMMISSIONER KNOTT: I think a big red cross might work better.

DR PARSONS: Yes, I agree. Or a white cross would be particularly handy.

FEMALE SPEAKER: This one shows the existing shelterbelt. Sorry to interrupt, but diagram 15 is the actual shelterbelt. It shows the existing trees.

DR PARSONS: The question the commissioner is asking is are crosses missing from these as existing trees?

FEMALE SPEAKER: Yes.

DR PARSONS: I think that's quite (overspeaking). There is some additional planting that is going to go on, on that shelterbelt, and the idea behind that is to provide some stability to the ground around there. But also to -- if you have a line of trees that's one thing but if you have a second line of trees you create a corridor and additional buffering but you also provide some protection from predators, from light. So there are actually some additional trees, particularly to the western side, where additional trees are going to be added to that shelterbelt.

COMMISSIONER KNOTT: Again, that is moving on to my next question. In 58 you say:

> "The development of the site avoids the loss or degradation of these significant sites."

The east-west shelterbelt is one of those.

DR PARSONS: Sorry, are we talking about my evidence-in-chief?

COMMISSIONER KNOTT: Sorry, yes, evidence-in-chief, 58. You were saying that the site avoids the loss or degradation of these significant sites yet we have heard from others questioning that point that you just made about the creation of the second route and the meadow grass between and whatever.

Are there examples where that's been done that you can point towards, where that's actively been promoted as something which has been seen as acceptable or is it, as you've heard by others, experimental?

DR PARSONS: It has not been done as a mitigation that I know of but there are sites within the Waikato where we know that bat -- we get very high bat activity in similar structures. I don't know how much you know about the Cambridge section of the

Waikato Expressway. There is a property there called the Lloyd property which looks like something out of the south in the US. It's a beautiful long driveway fringed by oaks. Opus has done a lot of work there. It is very, very high bat activity and the activity is down the middle, down the driveway. They've done surveys on the outside of those. There's still activity but it's decreased, the bats are in the middle and they're flying straight down the middle. There's uncertainty about how many actual bats there are. A bat can fly up and down repeatedly over the space of 15 minutes and make it look like there's thousands of them there when it is only one. So there is a lot of caution needed when taking activity to numbers. I think everybody recognises that. But that's really what we were looking to mimic and we know that being a landscape in that area that we get a lot of bat activity. It makes sense when understanding their biology.

COMMISSIONER KNOTT: So is this benefiting bats then, that concept on the heart of the eastern shelterbelt we are seeing within the Knoll Reserve because that has happened to the rest and we have got the diagram on that other one that was mentioned a moment ago, it shows that. But here we have a single (inaudible), do we not?

DR PARSONS: It hasn't shown up in this diagram but from the western side where the lot deferrals are, there is a second line of trees to go in there. I would need to talk to the engineers and people about the stability of the land, how that could be done, but it could be beneficial to the bats, yes. Continuing that line across the sub. Certainly there was discussion about that early on. I'm uncertain about why it's just the western side of it at the moment but it could be for an engineering reason but I'd have to check.

COMMISSIONER KNOTT: Thank you. Sorry, just bear with me as I scroll down my notes. So I picked up the question about the Lloyd property, which you have made clear.

Moving on to your evidence-in-reply, just running through I have a few problems too. This whole issue of light, I think it would be useful to hear a bit more about that, and I appreciate there is a lighting expert involved now, it would be really good to understand that. Because we are talking about 0.5 of lux, could you just explain to me because I think I have missed it, what part of the site would be ensuring that it would be below that 0.5, or whatever it may become, lux.

DR PARSONS: I'll try and find the various diagrams. If you refer to this (several inaudible words) provide the summary of it, we're talking at -- I think this probably will need to change based on the advice of the lighting expert but the plan that we have in place, and it's in my evidence-in-reply, is that it would be on the eastern side of the deferred lots looking at light levels behind the plantings. What is the concern is that light that is not just shining on the plantings that would go in there but that it will penetrate through. You will have seen diagrams of how that area's going to be planted and it's a mixture of tall and low stature. The point of that is to create multiple edges that are buffered for the bats to fly down. So the outside edge is important but the light that is spilling into those inside edges are also important and are potentially going across the river as well to Hammond Bush. So we want to look at how much screening and what the light levels are immediately on the other side of that screening.

COMMISSIONER KNOTT: So at this stage, the measurements would not be taking on the residential part where the lots are, it would not be taken from the street, it would be taken immediately inside that first row of planting?

DR PARSONS: That's the current plan. Having said that, I think -- that's probably where those would be taken. The level of that 0.5 lux I think needs some revision.

COMMISSIONER KNOTT: My question, I suppose, really comes down to does trying to achieve 0.5 lux within that area have -- clearly will have a knock-on impact upon light levels within the street and whether they can be made an acceptable level for people living there in terms of crime prevention, et cetera. I suppose really moving on from there, and I think it is mentioned in the appendix, talk about some monitoring of light levels and potentially going back and introducing - that is in annexure C, this page - but to the bottom of that, that talks about the thresholds and measuring and potentially having to then place further restrictions on new property owners to ensure that they do not install, I suppose, lights which actually increase that light on the area you are measuring. But what struck me from that was that you go and you measure, you find the light level is too high within that area, but you are actually only gong to apply a further constraint on new sections moving forward, not from those people who have already installed floodlights on their properties, for instance. Is that not a fundamental flaw, the fact that you get to the point that it is too high but how do you move back?

DR PARSONS: It is not fixable. That current thinking on that is that restrictions may be placed on those lots prior to their development. Also the lighting expert has provided some information ... I'm just trying to think to read you the relevant section. But essentially what it says is this is standard practice now to reduce lights built and it is very easily done through very directional low pointing lights. The source of light that we are talking about here is from the houses. There is sufficient information I think on the street lighting and pathway lighting to show that there are no lights that are coming out from there. It is what is happening in the houses when people turn on their lights with their curtains open and things like that.

I know it has not been settled yet but there is certainly ongoing discussion about from the beginning placing those restrictions on those lots to prevent that from happening so there does not need any retrospective change.

COMMISSIONER KNOTT: It is probably not your area but I will ask the question as it moves on from there. Do you think there would be benefit therefore actually providing outdoor lighting, for instance, on houses from day one so that people are not

going down to Mitre 10 to buy a light and putting it up and thinking it is going to be okay when in fact it does not meet the standard. I think it is going to be quite a hard one to please, in a way. Would it therefore be better for all those matters to be sorted from day one so everyone has their lighting in and they are not intending to ...?

DR PARSONS: As you say, that is beyond really my area of expertise. The thing I would say is that if you provide what you consider or the developer considers to be sufficient lighting for the houses, that still does not stop people from installing spotlights and doing that as well. I think it is a reasonable idea but human nature and human behaviour then comes into it.

COMMISSIONER KNOTT: Just checking that point about deferred lots. In 11 of your reply you mention:

> "Roads and streetlights adjacent to these areas will be installed in advance of housing construction."

Does that mean effectively those roads and streetlights will go in when those other lots that are not there are developed, do you think? Or will ...?

DR PARSONS: It's my understanding that the roading and streetlighting will go in ahead of the deferred lots. But the light and modelling from those streetlights shows that within, I believe, pulling a number out here, about 12 metres there is zero lux still. So the streetlighting is very specific. It's very directional, it's downfacing to avoid any outward spill of light. We do, I believe, in other evidence that's been submitted, those light models are in there to demonstrate that.

COMMISSIONER KNOTT: Okay, thank you. Just double-checking the - I am jumping around a bit here - back to the plan we had a moment ago, the one still on the screen. So the gully is now shown as indigenous forest restoration.

DR PARSONS: Yes.

COMMISSIONER KNOTT: I cannot recall whether that is a change or whether it has always been --

MR MAKGILL: It has always been the case.

DR PARSONS: It has always been the case.

COMMISSIONER KNOTT: So from your perspective is there an issue with having the bridge or the two crossings there or are there going to be issues with bats moving through there?

DR PARSONS: It's an interesting question, particularly with the Waikato Expressway. There's been numerous questions raised about the barrier effects of bridges and there's literature internationally that shows for a certain species there's a barrier effect of bridges. But there's also a number of precautions that can be taken to facilitate the bat movement. Certainly an example I can give you is around Tamahere. As you're going south, sorry, out of Hamilton and you know you drop into the gully and there's a car wreckers on the left, the gully system comes through there and the bats have been observed by numerous people crossing over that road.

I think in terms of the design of it, there can be steps taken to ease the flow of the bats but certainly from that, that's a very busy part of State Highway 1 and they do cross it. We would want to be careful to avoid any potential for collision. Trying to keep them high is a critical one. If you take away the forest from a long way from a road the bat, as I said, they like linear features, they'll fly along and they can drop and then fly along, which puts them at risk of collision.

So it's quite a standard mitigation to try and keep the trees quite close to the road. Obviously there's safety of people involved and then the bat will just jump over it as well.

COMMISSIONER KNOTT: Because the gully's quite deep. Where we have the bridge across the gully it is quite deep there, is it not?

DR PARSONS: I'm not sure it's terribly deep. There's certainly deeper parts of it.

COMMISSIONER KNOTT: You are happy with it?

DR PARSONS: As I understand it, it is not a bridge there. It's gone back to being a bridge? Okay, it's a bridge now.

FEMALE SPEAKER: It's for maintenance.

DR PARSONS: Okay. So they either have sufficient room to go under it and to control the lighting and things so that they feel free to go over the top of it as well. It is an interesting question, I think. Certainly as far as NZTA is concerned, they still have not got their heads around the impact of bridges.

COMMISSIONER KNOTT: Just looking at the use of new suburban landscape for long-tailed bats, and this was picked up on the questions I have asked other experts too. I just wondered whether ... I am not sure what, and I appreciate what you provided, I am just not sure that I have a clear picture of where else people can point to the long-tailed bats using urban landscapes or whether it is just to travel from one core area to another or otherwise. The only thing it is sort of similar to what we are dealing with here. I was trying to look at the Auckland land that you showed and thought that was showing me that they were not and I realised all the red dots were no bat species detected. That did not help either. I just wonder whether you could talk a little bit more about new suburban landscapes and where they are known to use something similar to this area?

DR PARSONS: I think the important point to make in the beginning of that is what do we mean by "urban landscape". Do we mean bats flying over residential housing? No, that's not what we mean. There have been anecdotal reports of bats flying over residential housing but I think that's unlikely. What we're talking about is areas of bat habitat that fringe on to urban areas. So, for example, Hammond Bush is an area of bat

activity that fringes on urban area. Sandford Park is an urban are. Mangakotukutuku Gully is an area that fringes on some quite dense urban areas. That's an important point to make. There's no assertion really from anyone, as I understand it, that the bats are going to be flying over dense housing. They may be but we don't have any evidence that they're doing that.

I think what's important is to draw the parallel between what the Amberfield site represents and comparing it to places like Hammond Bush, Sandford Park. What they are, so Amberfield is an area that fringes on the river with a significant riparian strip - sorry, I shouldn't use the word "significant" - with an important riparian strip along the edge of it. This is equivalent to what you might see, say, at Sandford Park where you have pine parklands area and the bats are using it. So it's an area of bat habitat that is surrounded and bounded by urban areas. That's what I would call urban bats.

COMMISSIONER KNOTT: I suppose the other issue there for me is that on which we have discussed in part, which is the east-west link. You have identified that this area, which will be an urban area, is currently important for bats travelling westwards from the river to the gully and vice versa. Are you content

then that given the role of the area at the moment, that sufficient provision is being made for (inaudible)?

DR PARSONS: I think the important part about Knoll Park is the fact that it's a park. The east-west link, particularly on the northern side of it, is actually bounded by a park. And as you go across to the west there's been lots taken out and lot deferrals to the northern side of that to provide a buffer for the bats. Particularly on that northern side, the area's reasonably clear.

COMMISSIONER KNOTT: So you are happy it is meeting that need?

DR PARSONS: Yes. I mean if you had houses on either side, fringing within a few metres, I think that -- I would question that. The presence of Knoll Park, the deferred lots, the additional planting as well.

COMMISSIONER KNOTT: I am just double-checking through the rest of my notes. Bear with me. Just going back to annexure E of your reply and the plan that I mentioned, a few pages on from there, which actually shows Auckland, because they both refer to Auckland. We have the plan, probably the plan is more important, the Auckland region, I am just lost with the

significance of that and I wonder if you could tell me what I should be seeing.

DR PARSONS: What that really is highlighting is bats are not restricted to native forest, that they're in a variety, and that's -- the case in particular at Riverhead, how's your Auckland geography?

COMMISSIONER KNOTT: Yes, good.

DR PARSONS: Good. So around Riverhead there's an extensive pine plantation up there and the bats are using it. Really the point of this is that they are not restricted to the native forest, exotic trees are also important for them for foraging and roosting. Pine is a mixed one in terms of roosting as Dr Borkin has shown with her PhD, and various other things, but they're in these exotic areas. This is really to re-enforce the plan that we have for planting, which is a mixture of natives and exotics is relevant.

Some of these areas around west Auckland are reasonably well-bounded by urban areas but I don't think that they're -- I don't have detailed knowledge of all of them but I would say

places like Sandford Park and Hammond Bush are more approximate to urban areas.

COMMISSIONER KNOTT: That would be what I take from this certainly, yes. No, that is good. That is it from me, thank you.

MR MAKGILL: Excuse me, sir, I wonder if I could just, by way of not re-examination but just ask a clarification question from my witness.

COMMISSIONER WASLEY: Yes, you may.

MR MAKGILL: So, Dr Parsons, you discussed the difference between baseline data that is collected for the purpose of mitigation and then baseline data is required to address uncertainty in respect of the implementation of the mitigation. I wonder if you could give two tangible examples to try and explain what you are talking about so the difference is illustrated.

DR PARSONS: Sure.

MR MAKGILL: Thank you.

DR PARSONS: In terms of the facts, and the example that you got is for Amberfield where people are looking to maximise the detectability of bats. You really want to know if they're there. So you're going to be particularly targeting areas where we know the bats will be found, along hedges and things like that.

At the same time, you don't want to just restrict yourself to those areas because then that brings into question where else are they? So it's designed to cover off the site and to work out what the important features of the site are, relative levels of activity, how the animals might be behaving in terms of feeding and the like.

When you start to talk about baseline data or adaptive management, you're talking about what I would call a much more robust model that has to bear scrutiny under some quite detailed statistical analysis. An example of that would be what's going on with the Hamilton section of the Waikato Expressway. They did surveys to look at areas that were being used by the bats. Subsequent to that they have ongoing monitoring that goes on. It's been designed by a statistician. It looks at other correlates of bat activity which includes environmental factors,

overnight rain, temperature and the like. Importantly it also has control areas. For the Hamilton section they're also surveying Pukemokemoke, which is out to the east, and Pirongia.

The consideration there is that within this urban matrix, if you demonstrate through your model there is a decline in bat numbers, was it caused by the development? Was it caused by what had been consented? That's actually quite a challenge for these approaches. So for Hamilton they've got these other areas where they're monitoring. So the idea being that if those areas are in decline or increase that could be compared to what's going on within the particular development site.

So the structure of it and how you do it, it's the longevity of it. Fifteen years it goes on, the statistical robustness of it to determine a 10 per cent decrease in bat activity over five years, or whatever is stipulated, brings through different design elements.

COMMISSIONER WASLEY: Thank you. Commissioner Lovell.

COMMISSIONER LOVELL: I have a few questions as well. Starting with a question around here the objectives of the EMMP and the monitoring and management plan. We have discussed this a couple

of times, there has been a suggestion in the current positions that there will be some alignment with the southern links process there. I just noted that particularly with I consider (several inaudible words) in terms of when I am comparing -- where something has worked I always look at the objective first and to what the original objective was.

What we have in the southern links is a clear objective for no net loss. What we have for the ecological management and monitoring under conditions is an objective to demonstrate avoidance when we mitigate and obviously will compensate. They seem different ones, no loss ones; so once I have a concept the other one is where (several inaudible words). What is your view in terms of what could be the objective?

DR PARSONS: The objective for me of ongoing monitoring of the site is to monitor the uncertainty, as I've said. There is some uncertainty about the impacts. Light is the principal one; is to monitor and deal with any effect that may happen because we are uncertain about that. As I understand it, that is one of the key roles of adaptive management is where there is uncertainty. I am not an RMA expert. But as I contend, no net loss applies to offsetting compensation. I am very happy to be corrected on that. I'm not an expert. That is how I understand

it. We have not proposed offsetting or compensation. We believe that there are no residual effects.

Really the adaptive management is things where there is uncertainty we will develop a plan. I would really welcome, I am talking to the other submitters about that in caucusing, about what that plan might look like to clearly identify those uncertainties and the adaptive management process for addressing it.

COMMISSIONER LOVELL: A bit like Commissioner Knott, I will bounce around a bit, if that is okay.

DR PARSONS: Sure.

COMMISSIONER LOVELL: Picking up on your discussion with Commissioner Knott around pastures and you say that pasture is not an important factor and they avoid them. I note that attached as an annexure of your evidence in reply, Ms Cummings noted that the bats are using open pasture and I wondered where, in terms of range, if we are talking pasture, over the land used, where would the proposed meadows sit in that range?

DR PARSONS: That's a fair point. So the meadows are first of all to provide -- are set back away from the area, so it provides distance. As I understand it as well, the meadows and things have also been designed for insects as well so that there's a supply of food for the bats. So with any area of trees that create an edge it buffers on to something else and so whether that be parkland or pasture, when you create an edge there's always going to be something on the other side of it and so the pasture and things that have been proposed here is creating that edge but it's creating it away from where the street lighting may be so that we get to zero lux before it comes there, but also I understand that the plant ecologists have suggested that these are good areas for production of insects, which will come up and actually form rations for the bats as well.

COMMISSIONER LOVELL: An earlier witness today raised a report that has come out recently, the Davidson Watt Report.

DR PARSONS: Is this the AECOM radio tracking study report? It is? Yes.

COMMISSIONER LOVELL: I do not have it on me, but she noted that there was a ranking matrix on there with native and exotic trees

down one end all the way as you would expect urban down the other with lifestyle farms, agricultural and ... So thinking on that and our commentary, I guess my question is are the meadows really the best use of that space for bats as opposed to say the native/exotic planting or potentially low-line planting or a combination of both? What is the best use of that space?

DR PARSONS: So I think one thing to consider with the AECOM study is I have seen that there's sort of middle rankings for things like pastoral parkland I think it is. This is where you need to be a little bit careful about radio tracking studies. So, if a fix for that occurs in let us say pasture, that fix would be classified as pasture. The question I would have for those doing the study, and to be fair to them I have not asked this question and they may have a very reasonable answer, I suspect they do, what is it going to do?

And we struck, and Dr Borkin knows this from her PhD studies, we were seeing relatively high levels of activity in clear-felled areas of pine forest, which seemed a little bit odd to us, but what it really was was an artefact of where the monitors were put, they were in clear-cut areas but they were bordering on older-stage trees. So I think without that additional information it's hard for me to interpret what they

mean by pasture and parkland. I can talk to Ian and ask him. So that would be one thing I would caution on that, for myself as well.

The other thing I would say about the set back in the pasture is, you can imagine that if tall stature trees were to a place where that meadow was, it would take it to the edge of the street, and so if the bats were going to fly along the edge of that there's potential for them to be exposed from light coming into the development before it could attenuate would be much higher. So having that set back allows the light to attenuate before it would shine on to those trees.

The other thing about the planting as well is that I mentioned before there's an advantage to having multiple edges and the planting scheme that is a cross-section through the northeastern terrace, and I'm sure you're familiar with it, it's not a solid block of trees. Because, if you have that, you have two outside edges and that's it. What there is is a series of tall and low-stature plantings, which creates multiple edges for the bats to exploit, particularly away from where the development is and along that edge of the river. So planting it as a continuous part of forest, tall stature, close to the road, I don't think would be the best strategy for the bats.

COMMISSIONER LOVELL: If we can go to annexure A of your evidence in reply, now this may not be a question you can answer, but attached to your evidence, what do you mean would be deferred in terms of lots, are you saying the lots, for example, are not sold before, or something that can't be built on, are they not sold, how does that work?

DR PARSONS: I believe there are some section 224 that I overheard early but I would probably defer to the others on the actual --

COMMISSIONER LOVELL: But this is yours.

DR PARSONS: I know the distinction exists on whether they can be sold or not and are basically not sold.

FEMALE SPEAKER: It's currently in the conditions. Dr Parsons can talk more to the requirements of the conditions but it is 4 metres high and 80 per cent canopy closure and my understanding is the deferral lot condition, as currently in Mr Serjeant's evidence in reply, is that the lots would be able to be created but no building would be able to happen until that 80 per cent canopy closure or 4 metres --

MALE SPEAKER: 4 metres in height or 85 per cent canopy closure in the northeast part I think, to the south it goes to about 75 per cent canopy closure, but it is the height and closure.

COMMISSIONER LOVELL: My question is, will they be sold before?

FEMALE SPEAKER: Yes, but the way that the condition is currently drafted is that there will be a consent notice on the title that there can be no building until they have been approved.

COMMISSIONER LOVELL: And then you may or may not know the answer, but just in the second paragraph, the final sentence:

> "Therefore, earthworks across some stages will be undertaken well in advance of housing construction, and sites will be grassed in the meantime."

I take that as a positive. My only question was, will the earthworks themselves have some sort of potential effect on the bats?

DR PARSONS: I don't believe that in those areas the vegetation is being taken out and otherwise I think all of the work is

happening during the day and so the bats, as far as we know, there are the three -- the male that was found in trees there, but I don't think trees will be lost, and so the work will happen during the day and therefore it shouldn't disturb the bats.

COMMISSIONER LOVELL: And just on the last paragraph, the last sentence:

> " This will provide a longer interval for habitat improvement in advance of development in the southern portion of the site, and enable confirmation of performance measures within the timeframe of the proposed development."

In terms of timeframe, are you still talking about I think it was the five-year timeline for the canopy, is that what you are talking about?

DR PARSONS: So it's 4 metres high and in the southern part I believe it's 75 per cent canopy closure. I think, if we go back to the timing of that, that's really based around our original thoughts on how we might measure light levels as the development goes from west to east. But now with the advice from the lighting engineer we have to rethink that. So it's the timing in terms of deferral of those lots is really set by the vegetation. Whether it be built from east to west, north to

south, it doesn't really matter, until the vegetation has reached that threshold those lots won't be released.

But what we were thinking about was, as the development goes from west to east and we start to see light being generated from houses there, we could look at what the level of effect might be and to use that to then say, well before it even gets to that eastern part, and this goes back to Commissioner Knott's comment, before it gets to that point we could instigate measures. I think we need to rethink based on the lighting engineer's comments who we approach the management of light.

COMMISSIONER LOVELL: Sorry, I have terrible writing, so I ...

DR PARSONS: Yes, I'm the same.

COMMISSIONER LOVELL: So we are on to annexure C and picking up on the bat activity section, now the first one around use of monitors, it was also in the conditions as well, given your comments I think at page 25 of your evidence in-reply, which referenced the further strengthening of knowledge, Ms Cummings's feedback and the email where she comments that the combination of acoustic and radio telemetry actually allowed for identification of some important features. I am wondering why,

adapting our own conditions, only referred to acoustic monitoring?

DR PARSONS: So the radio telemetry and the acoustic monitoring that's occurred here in the beginning gives a very good picture of the effect. Changes in behaviour of the bats as you move through into the baseline monitoring, you would have to look at what you're actually trying to determine from that and it goes back to a much greater level of detail if you're going to be doing radio telemetry. So it would be who is it that's moving through, it's relatively imprecise, I think in the Davidson-Watts report they're talking about 100 metres in terms of the accuracy of it, the acoustics will do that. It's also a practicality then in terms of the amount of time and effort that it takes based on the results that you would get and whether or not it's necessary.

So the answer I'll give you in short is that acoustic monitoring, so the thing would be is what's the most practical way of doing it that gives the result that is required for the bat management? And if it's designed properly then you would get that from the acoustic monitoring. An example of that might be how do you use the radio telemetry when you're comparing that to another area off site control, do you need to radio track

there? Is the lay of that landscape equivalent? It will be very, very difficult to make those comparisons using radio telemetry.

COMMISSIONER LOVELL: I guess even up to the identification of roosts with radio telemetry provided recently that were identified areas that were considered medium to low light, and given again we have heard Colin spoke to this and others in terms of the uncertainty around acoustics itself, I am just wondering why would you not from a risk management point of view look at both and not limit ourselves in terms of what we are looking at in terms of the conditions. Because, at the end of the day, somebody has to look at those conditions and say, "Okay".

DR PARSONS: That is a very good comment. What I would refer you to is two things, first of all the radio telemetry I don't think is going to give you a larger amount of certainty. As has already been pointed out, it depends who you catch and where they choose to go, the use of this is very ephemeral for bats, so you might catch a female and she might not go to a roost there, you might miss a bat, and so it doesn't give you certainty that they're there.

The thing I would point to is the roost removal protocol. So the roost removal protocol actually will require each tree that's going to be removed to be surveyed for bats, very specifically that tree. And in other roost removal protocols there are safety nets in place to stop the removal of particularly maternity roosts, they are the most important, it's where the females are breeding.

And so rather than using radio telemetry what I would say is there are other better methods for doing that that are much more specific to those trees and provide a much more specific management of those. So it's not the fact that we wouldn't do it, there's another way of doing it that's better.

COMMISSIONER LOVELL: Okay. Maybe my comment is by limiting them like that with acoustic monitoring, I would hate to see that we are limiting ourselves in terms of monitoring.

DR PARSONS: I would have to check the conditions but I do believe a roost removal protocol is listed in there.

COMMISSIONER LOVELL: And just on your comments around broad home ranges and the interpretation of habitat and use of that that and that you caution that. But I note that Ms Cummings in

her email suggested that sampling co-ordinated with Southern Links will provide a landscape-wide context, so is one stronger than the other, how does that work?

DR PARSONS: So I would hate to put words in Ms Cummings's mouth, but my interpretation of that is that we would understand what is happening with the bats outside of the footprint of the Amberfield development, because they are working outside the footprint of that development.

During our earlier caucusing, we had a degree of discussion about the importance, not only of the Amberfield site, but of the broader landscape that surrounds it and that's a difficult one because we have no control over that. But we all recognise that's important, for example the east/west link. If something happens to the west that takes out that vegetation then what is the point of the east/west link? Now we have to restrict ourselves quite rightly to what we were talking about, what the Southern Links allows us to do is to have data coming in from that project on the broader landscape that's going on.

My caution about radio telemetry is that, I understand you've had a presentation about how radio telemetry works and about home ranges, but a very, very quick summary is that you

have a series of fixes, the home ranges that have been drawn I'm pretty sure are based on what are called minimum pockets, so basically join the dots, grab the outermost of all of the points that you have, and that defines the home range. That doesn't mean a bat has been in 80 per cent of it, it just means that it's encompassed by the outermost points.

Now the core areas actually do focus on where the bats spend the majority of their time and so are more accurate in what the bats are doing. And in my annexure you will see that there's the actual fixes, now those are plus or minus 100 metres I think and Ian Davidson-Watts has said, so they will know exactly where they were, and so that's a much better representation of what the bats are doing. You theoretically could have a massive lake in the middle of it that the bats won't fly across, but it appears to be part of their range.

COMMISSIONER LOVELL: So, just on to the next point, which is around the gullies, from your experience at other sites, what are the types of trees you would be looking for?

DR PARSONS: So in terms of bat activity I would be looking for a statistically robust change in bat activity of x-percent, 5 per cent, 10 per cent, decline that we would look for. But I

think the models would be able to detect if there was no change or an increase in activity. In terms of uncertainties of effect, the way I've been thinking about it, and this is my thoughts at the moment, and I've shared this before, it's actually been shared with me, it was an idea of a colleague, it's to actually look at what is currently going on with accurate light levels and estimates of bat activity through acoustic monitoring and use those to determine what the threshold level for lux is.

So, for example, if we have an area that's got relatively high light levels and very low bat activity versus a darker area, to quantify what that is and to use that to derive the trigger value for what the lighting will be. Then as you do the monitoring you would be monitoring the bat activity plus or minus what the boundaries are for modelling and the light levels and you would be looking for changes in the activity correlated with the changes in the lighting.

Now, if that activity started to drop and the lighting appeared to have no effect, you still have that as a trigger that there was an uncertainty that was truly uncertain, we didn't know what it was and something has happened. I don't

think that would happen and hopefully through the course we would identify everything that could go wrong.

COMMISSIONER LOVELL: And just on the point that:

> "Trigger values will be determined via statistical analysis of pre-works sample data."

Just picking up on the point that you made in terms of all models may not be absolutely accurate, how accurate to you consider this needs to be to ensure that we're not missing key triggers?

DR PARSONS: Yes, so two different types of model, one is a model, so in terms of the Crewther and Parsons, that is truly a predictive model, it's saying that we think they'll be here, and that gives you an indication that I should go and look. But there's a number of assumptions that go on with that.

What I'm talking about with this other model is actually measuring the amount of bat activity, from that determining the degree of variability that there is in that, and then you can use that to direct your sampling so that you could say, "I can detect a change in bat activity of 8 per cent, 9 per cent". And so it's what is called a power analysis, so it's a very

different one. It's really defining how accurately you can do it and what you can truly detect, so it's a different type of model.

COMMISSIONER LOVELL: And when you start talking about those percentages, given we are dealing with the threat level in terms of the bats and the risk and a few points, what is that level in terms of your risk, would 8 or 9 per cent, 5 or 10?

DR PARSONS: Yes, I'm just throwing numbers out there at that point. It has actually been determined by other consent conditions and off the top of my head I can't pull it forward, I would welcome anyone else who knows particularly for Hamilton, a section of the Waikato Expressway, it is in their consent conditions. I could look it up for you and supply it to you. I have that on my laptop.

COMMISSIONER LOVELL: Particularly I would be interested even on the threat level has increased since I think 2016/17, so consents that actually reflect that increase in threat level, I would be keen to be understanding where that threshold has been set.

DR PARSONS: I can certainly supply that for you, I'd be very happy to do that.

COMMISSIONER LOVELL: Thank you. Next page, opportunities, so triggers have happened, we have opportunities to deal with them or manage them. So the first one, extension of lot deferrals. Recognising and including the comments you made around the trees and not necessarily things caught up in five years, but rather in terms of time for the canopy fill and to grow and all those sort of things, why does the timeframe between houses being built and a tree up, which of course is very different in terms of canopies and things like that, what if go live and the issues arise after sections have been built on and we can't pull the houses down.

DR PARSONS: So just I would ask for some clarification, are you talking specifically about the deferred lots or are you talking about other lots that are not deferred? Because the extension to the deferral is really about let's say that if the light levels are being measured and that on the inside of that zone that the light levels are still too high and we need to do something more about that to keep them low, then we would look to extend the deferral period of the deferred lots.

COMMISSIONER LOVELL: I guess what I'm asking is it's the timeframe, you defer -- will a trigger potentially be identified is what I'm asking, is there potential for a trigger, for the decline to occur after the houses have been built?

DR PARSONS: No, I see what you mean, so that timing is obviously important, so, for example, if we have an ongoing monitoring, particularly of the bat activity side of it as well as the light levels, and that the levels are -- and please correct me if I'm wrong, the levels start to decline after the trees have reached 4 metres and the canopy has closed and we start to see a decline, what do we do about that? Because we've already reached that trigger point and the deferred lots have already occurred.

What I would say to that is that the monitoring obviously has to -- the plan for it has to be able to detect -- have power to detect the decline prior to those lots being released, because having -- so let's say we develop a monitoring scheme that says in seven years time we will be able to detect a 10 per cent decrease in bat activity over the site, and the lots would be released say after three years, it's not going to work because we lose that opportunity to do it. So that comes down to the design of the monitoring study to say that we have to be

able to determine what's going on before those lots can be released. So there's a critical timing element that goes on there as well.

The thing I would also say is that, if we are monitoring the light levels as well as the bat activity, and the lots are released and built on and the light doesn't show a change, but the bat activity starts to decrease, it clearly wasn't to do with the light and so we would have to think about what else we would do about that. There could be a number of other activities that could go on to try and do it, but I think there would need to be discussion about how to manage that.

COMMISSIONER LOVELL: I think it sort of comes back to the point of that when the lots will be sold, because when I contemplate a range I am going to say as close to absolute no, and in this instance nowhere in your list is simply not using those lots, so they are always just deferred, they are never not used, notwithstanding if something happens and there is a trigger that means that they should not be used because there is limit.

MALE SPEAKER: Excuse me, I am pretty sure that is a legal issue. The fact is that, if you have a deferral contingent on

some triggers, those conditions are never satisfied, what is the deferred trigger, I think is the point that has been made.

COMMISSIONER LOVELL: Well that is why I was asking if the sections have been sold already, that is all, if they have been sold already they cannot be deferred.

MALE SPEAKER: Yes, they can.

MALE SPEAKER: I mean that is a legal arrangement that needs to be addressed between purchaser and seller.

COMMISSIONER LOVELL: Probably my question then is what, in your experience, have conditions such as this contemplated, from his experience of that?

DR PARSONS: So I can't give you an example on a residential development, but I can give you one to do with a wind farm that Mr Kessels was involved in as well, and that involved quite a degree of uncertainty, so this was the Edgemark Wind Farm, which subsequently hasn't been built, and so the questions there, that level of uncertainty was -- it really came down to how many bats can the turbines kill before the population becomes unviable, and so we didn't know how many bats there were, we didn't know

how many bats would be struck by turbines because long-tailed bats sort of fall within that relatively high risk, we've never seen any bats struck by a turbine in New Zealand.

And so there was a series of studies that had to happen beforehand to establish that baseline, which is similar to what we are talking about here in terms of marking the size of the population, doing all of these things, and that then came back to the measurable proportion of the number of bats that were acceptable in a legal framework, acceptable on an ecological one, to be struck. And then there was a series of conditions that were put in place to control that.

So, for example, if a particular turbine was shown to be striking bats and it was above the threshold, that turbine can be fettered in certain wind conditions and that's been shown to decrease mortality by about 90 per cent. Decreases electricity production by I think less than 1 per cent, but it reduces that risk to the bats.

I think there was also a provision in there that, if the levels got to high, that they would translocate the population to an offshore island, which I wasn't all that -- I thought that was a big stretch, but it ended up in their conditions, because

there was no certainty that a translocation was ever going to work. In the conditions it didn't have to prove that it worked.

COMMISSIONER LOVELL: So the assumption is there was all water around and they're not going to go anywhere.

DR PARSONS: No, they'll go, they'll leave, we have enough experience to say that they would very likely leave. The birds leave. There were some birds moved to islands and they were back on the same perch they found it on. The bats will move as well and they're very mobile.

So that gives you an idea of the types of things that could be done. We could talk about increase in screening. I know that there has been talk about provision of artificial roosts and that sort of varies between let's put them in any way or use that as actually a mitigation for this uncertainty as well. So there's a number of things that could happen in that area.

COMMISSIONER LOVELL: So, if we go on to the modification to species assemblage and the plant density, what does that mean, is that contemplating more natives versus exotics or just a --

DR PARSONS: Sorry, can you refer me to a particular --

COMMISSIONER LOVELL: Yes, opportunities, it's the next one, it's the third one down, modification to species.

DR PARSONS: Modification of residential berm plant screening, species assemblages or plant densities and vegetation buffers. So this could be a change in the type -- again, probably this would be a better question to the plant ecologists, but in terms of what the bats are doing, changing the density of vegetation buffers to increase light or decrease light penetration as they go through it, the planting is not doing that properly, considering additional planting that would grow more quickly and really be specifically to shield from light rather than providing roosting opportunities and things like that. So changing that approach.

COMMISSIONER LOVELL: Then move over to the next page the installation of artificial bat roosts, you have mentioned a lot of information and I have a particular point and I noted that there is no set research in terms of how effective they are. Given this, why would we cut down any tree that has a potential for roosting?

DR PARSONS: So there's a big difference between an assessment of a potential roost and a roost that is actually used and --

COMMISSIONER LOVELL: I think you said at least one is contemplated that has been identified with a roost in it is going to be cut down, given your experience.

DR PARSONS: So the first part of that is that it's a planning or an engineering question on whether the tree can stay or be removed and those discussions have happened to retain as many trees as possible, so that really comes in the first instance to an engineering question about whether the tree can be retained or not in that particular area.

Then the question comes down to the importance of that tree and the opportunity for the bat or bats to be in another alternate place if we take that one out.

COMMISSIONER LOVELL: But given the evidence that we have seen, which has strongly indicated that a key issue for bats is roosting, and given we are not sure it will roost per se, then I guess from acceptable, a bit more of the uncertainty, are they not all important?

DR PARSONS: The point I would make is that there is a spectrum of importance, so for example if a tree was seen to be a maternity roost then, yes, it's important. Acknowledging that we know that there was a single male bat in one tree, there's a question about the other two trees, the information that we have says the males are much less specific about the trees that they select and there are more opportunities in the environment for a solitary male. And so we talk about roost trees as if they're a single entity and they're not, there is a scale of them and there's a different scale about how they're selected.

So Dr Borkin did a really nice study looking at how specifically bats in the pine forest select -- males and females versus their trees, females were quite selective, distance to water and things like that. Also, biologically, their need to retain a maternity roost for the continuation of population is a crucial one, no one would doubt that. A solitary male in a tree, and that tree is removed, is an opportunity to move to another tree - because he is less selective - is greater and I would hate to speculate that it would happen, but let's say that tree gets cut down and the male can't find somewhere and he dies, what will that do to the population? Very, very little. If you lost a maternity roost and they all died, what would that

do to the population? That could have a significant effect on the population.

I would also point -- I mean that's sort of my point about highlighting all of these planting plans as well, I mean there are trees that are going to be removed, it's a relatively small number, I think George actually told me a little bit before but I forgot, it's a relatively small number. But if you look at the plantings that are going to occur there's potentially a lot of opportunities for improving that habitat for roosting for the bats.

COMMISSIONER LOVELL: I guess I think I am also recounting that, yes, planting is going to happen, but it is going to take time.

DR PARSONS: It is going to take time.

COMMISSIONER LOVELL: And so even one would --

DR PARSONS: And the conditions for the tree removal protocols that have been written and implemented before provide a substantial amount of protection for a maternity roost.

COMMISSIONER LOVELL: Just wondering, the last one:

> "Adaptation of planting and long-term management specifications within buffered corridors to ... transition to habitat dominated by native forest species."

And just recognising that -- but your current framework in terms of the maintenance and planting is set through in the time, ultimately what we are talking about is returning these close trees (?), so I am wondering whether this is actually something that still will given that ultimately this land will pass into public. So I am just asking you to comment on whether there was anything possible due to this framework.

MR MAKGILL: It is kind of legal question, which we provided legal submissions on and conditions were attached to the developer and that is separate to the transfer of title, so that is addressed in my legal submissions. So the timeframe has not been part of it, it is something remitted to the ownership of lots by the developer, conditions are intended to run until they have run their course. They are not being proposed on that basis. It is quite normal to have land use conditions that have to be complied with over a period of time.

COMMISSIONER LOVELL: So are you suggesting that -- so I am thinking at some point this land will go to the council.

MR MAKGILL: Yes, but that does not mean that the condition as stated still does not apply to the developer. I mean that is how the rest of the world works, you know.

COMMISSIONER LOVELL: Okay. And we have a new condition of 98 and I do note your commentary in terms of I think offsetting, mitigation, and all those sort of things, but 98 actually contemplates at least site restoration if necessary. You state in your evidence in-chief you believe that will provide or probably does not necessitate off-site impacts. Given we have got this in the conditions, in your experience how effective is that sort of approach in terms of this?

DR PARSONS: In terms of offsetting? That's a really good question. It's been done in a number of places and it's still being recommended, the Mount Messenger work is looking at pest control over a very wide area. Around effectiveness, I would say that the great work that the Department of Conservation has done on pest control and predator control in places like the Eglington Valley and others demonstrates that there is a positive effect in terms of stopping decline of bats.

Have there been any detailed studies when it has been actually used as an offset to determine whether that's happened? I don't know of any specific examples that demonstrate that. But I would be -- from the work the Department of Conservation has done, I would be confident to say that the reduction in mammalian predators would have a significant positive impact on bats. But has anyone studied it as a particular offset and its effectiveness? I don't know of any studies that have done that.

COMMISSIONER LOVELL: Just one more point, a final point, Dr Flynn in her evidence noted that pest control is a wider, it's not just site specific, and that they intended to talk about a wide grouping that had been -- I think my point to her was it could have been tried somewhere, it could be starting somewhere, and one of the things I noted would be this use of an integration with Southern Links is that they have quite a strong section on pest control. Is that something you would recommend in terms of this proposal?

DR PARSONS: Pest control is a complex issue. How long does it go for? And we know from areas of forest, say Pureora Forest with stoats, when you stop, two weeks later they're back, and so how long does it have to continue for to maintain that? Does it have to go on forever?

COMMISSIONER LOVELL: Well Southern Lakes contemplates 20 years.

DR PARSONS: But in 20 years time, assuming Predator-Free New Zealand doesn't succeed, in 20 years time - let's hope it does - they're going to come back. Well very likely to come back, whatever the impact is. The other thing is, what are you trying to protect with predator control? If we had a confirmed maternity roost, for example, on the site, then yes, I would think that it would provide significant protection for those roosts. If there are no known maternity roosts on the site, I don't see what the benefit is, the bats are flying through, they're feeding and they're moving, they're not subject to introduced predator protection, the morepork might pick them off, but I don't see where an introduced mammal would have an impact on them.

So again it --

COMMISSIONER LOVELL: We hear that cats would take them.

DR PARSONS: Yes, I mean cats are pretty good at leaping into the air and doing things and there's a study that's just come out in Nature that says that, in terms of bird and mammal loss

worldwide, 89 per cent of it is due to domestic cats, not feral cats, which that throws everything wide open. I think that the risk to the bats as they're flying through and foraging, if they're not landing they'll be pretty high, they're going to go back along the top edge of the canopy. I think the risk to them is fairly low. If they were to come into a smaller stature tree, the ones perhaps around the Knoll Park, which I'm looking at in the photos, could there be a risk to that bat in that tree? Yes.

COMMISSIONER LOVELL: And then I just want to cycle way back to the whole meadows thing and in terms of they will drop down, so --

DR PARSONS: They won't drop down, I don't think, over the meadow, it's if you've got trees, trees, and they're trying to jump across, if the trees are too far apart they risk dropping down. But if you think about how they're using things, they're going across the river, down the riparian strip, and there's a little -- you know, I'm filling in a few gaps about what the bats are doing, this is my view, they're coming down the riparian strip, they're feeding opportunistically there and then they're going across that east/west link. I don't see a point in that where they would be dropping very low to the ground.

COMMISSIONER LOVELL: So they would not drop down in terms of meadows as for some insects and things like that?

DR PARSONS: I wouldn't have thought so, no.

COMMISSIONER LOVELL: I think that is me.

COMMISSIONER WASLEY: Thank you. Not too many questions left, Dr Parsons. I have just two or three. I refer you to the Streetscape Planting Strategy, that claim there, do you regard, in terms of that street planting as being part of the package of mitigation? If you do, if you can just explain its significance?

DR PARSONS: So I would consider -- well I guess what I should ask myself is will the bats use it, will they roost in it, will they forage along it? They may do but I can't be -- I can't tell you with any certainty that they are going to use it. So I would say that, how would I compare that to having no trees planted along those streets in terms of bats using them? It's better than that. Is it brilliant? I couldn't tell you that. One thing I think that it will help is with light and light penetration from those houses as they move across towards the

riparian strip. So they will act as a physical barrier and I think that's probably the best or the most tangible benefit of those trees.

The planting could be - and it's been discussed - the density of it could be increased, but that brings up the question then of whether bats will fly down a residential street with housing on either side and never say never with an animal but I certainly wouldn't say that it was fundamental to a mitigation strategy. The lights though, I think it's going to be important for that.

COMMISSIONER WASLEY: So this was really a question for you, Mr Makgill, in terms of your right of reply, but there is some value to that street planting in terms of mitigation, how that is then secured in the longer term, because once those streets are developed and planting put on and they are vested in the council, and then the responsibility for looking after that then tends to rest with another council department other than the one that is tasked with the lots, so I am just raising it for you to --

MR MAKGILL: So what is the question?

COMMISSIONER WASLEY: Well the question is, how then, if they regarded it had some mitigation purpose in terms of planting, how is that secured post vesting of those assets, including the trees, in the council?

DR PARSONS: I think that is to think about street lighting as well, including lights to be put upon the specific street lighting of some of those streets to ensure there is a low level of light spill where, when someone drives into a street light, HCC may find it easier just to replace it with a standard light or a standard hedge for instance.

MR MAKGILL: I consider it unlikely, given that they are going to be responsible for wider bat management strategy for Hamilton, but I will look at that question and I will confer with my colleague, Ms Mackintosh, and come back with an answer.

COMMISSIONER WASLEY: One of the reasons I raise it, because in other situations --

MR MAKGILL: It is not a question we would ask of any other circumstances.

COMMISSIONER WASLEY: No, but it is being aware of other situations where proposals, developed, vested, and then at some later time something else happens that actually removes the vegetation or changes the street lighting or whatever, which was originally given as part of the original proposal. So it is --

MR MAKGILL: It vests for a purpose to start with but let me discuss that with Ms Mackintosh if you need further certainty around that.

COMMISSIONER WASLEY: Yes, no, I am happy with that. Now, turning to the other plan, A3 table, Dr Parsons, and this is the Knoll Park landscape concept, and I am not raising any particular issue with the landscaping per se, but immediately north, this point where the shelterbelt joins the road in that area, there are some residential lots. I have just highlighted there one --

DR PARSONS: So we're in the southeast of the paddock, yes.

COMMISSIONER WASLEY: I just popped in a question mark in terms of the one that is immediately north. So in your opinion is there sufficient width in terms of that shelterbelt area and the adjacent land, in terms of that fulfilling the purpose in terms

of an area for bats to fly through then head further west as the case may be?

DR PARSONS: That's a good question. The answer to that is yes, I do think it is sufficient, and I draw that conclusion by looking at the types of habitats that the bats are moving through currently in Hamilton in terms of their proximity to housing. So an example of that is in my annexure where there's photos of - I will feed you a specific one - there are photos from Sandford Park, I am just looking to see whether there is -- yes, there is.

So if you look -- you have the main aerial photo of Sandford Park and then below it you have the two separate ones, so clearly Sandford Park has connections through to the gully, but it is surrounded by that urban matrix. In the bottom right this is an area where the bats have actually been observed flying through, so it's really a right of way that goes between a set of houses and they are flying through in that area. So it's narrower, there's fewer trees.

COMMISSIONER WASLEY: What would the width of that be?

DR PARSONS: I would be guessing it to be 20 metres. Sorry, are you talking about in the plan or in Sandford Park?

COMMISSIONER WASLEY: In the photo.

DR PARSONS: I have not been to that site so that would be a guess at about 20 metres but I think Andrew Blayney has been there taking photos.

COMMISSIONER WASLEY: And we are going to visit that.

DR PARSONS: Yes, so you can have a look and if he is along with you he can show you where that was. That photo we put in there particularly, that, if you look at the -- that is actually looking down to where P6 in the top-left corner is in that entrance to the park, you can see how it connects through, so that's the right of way that goes down into Sandford Park where P6 is.

COMMISSIONER WASLEY: Just made a comment in terms of Mr Blayney, we intend to visit Sandford Park, just the three of us.

Now, just let me check. Now, do you have Mr Serjeant's evidence in-reply before we --

DR PARSONS: I don't have it. Thank you.

COMMISSIONER WASLEY: So if I can take you to the proposed conditions, so I am on page 15 and also page 18 and I am looking at draft condition 69 and then 79. So the easiest one is we have it on the screen here and we have the north/south gully, which is shown as proposed indigenous forest restoration, a good proportion of it. Both 69, which is in terms of the objective of the ecological management plan, et cetera, and then the Gully and Esplanade Reserve Vegetation Management Plan at 79. Do you feel that that current objective in 69 is sufficient to actually guide what the nature and scope of that proposed indigenous forest restoration should be?

I suppose what I am getting to is, is there enough guidance in terms of what is to be achieved by that restoration and what does it look like, what is it made up of?

MR MAKGILL: I just wonder whether that is a question for a terrestrial ecologist, but I will leave it open.

COMMISSIONER WASLEY: I do not mind, and I am looking at it from --

MR MAKGILL: I know you are asking questions and wanting them to be answered.

COMMISSIONER WASLEY: -- from the perspective in terms of bats, which is a clear focus of discussion this morning. I do not mind if you have a terrestrial ecologist to add to it, Mr Makgill.

DR PARSONS: There's a lot to read in probably the timeframe that you want an answer in there, and tell me if my answer is inadequate for you and I'll try and be more specific. There have been proposals for gully restorations in the area where the - I'm trying to remember the name of it - it's basically where the sand works are. And the person who has instigated that has had a number of successful projects in doing gully restoration and that is part of the condition for that sand extraction. And certainly we know that the gullies are important for the bats and there is some precedent on how that would be planted to provide guidance for the gully to be successfully used as bat habitat.

Its connection through to the Mangakotukutuku Gully, it is raised as a potential connection point, but I think there are some caps in that as well, outside of the footprint of the development that need to be considered, but we know that the gullies are important even if they're coming from the south or from the north and foraging in the gully, I think it's an important habitat. And certainly if the way it's written at the moment doesn't strike all of those points there's a number of precedents that could be looked upon to guide the planting of that.

I think it's been an under-emphasised aspect. There is a time lag for that, I mean if you've been into the gully there's parts of that, if I was a bat, I wouldn't be overly enthusiastic about. But I think it provides some really good potential. And I think one of the things that I'd like to see more and more of in these is we talk about the timeframe for things to be useful for bats for mitigation and things and that's fine, but I'd like to see aspects that are much longer term because if we continue to focus on five-year benefits or ten-year benefits rather than lifetime benefits of the landscape, I think we're missing an opportunity to try and correct some of the nasty things that humans have done in this landscape. And I think that one falls into that category as well.

COMMISSIONER WASLEY: So it may well come up in the discussion through caucusing and no doubt, Mr Makgill, hopefully will take it through the right of reply, but it is just at the end of the day, in terms of management plans, if we grant consent that we are very clear in doing so that the performance expectations and outcome are well defined as part of any consent, so that is why I was --

DR PARSONS: Yes, and the plans, when they are developed, can occur with past experience and knowledge of gully restoration for bats as well as for other ecological reasons.

COMMISSIONER WASLEY: I suppose the issue around that is that we will not be involved in the subsequent approval process as to the management plan, so we need to be satisfied through the consent process that we believe what is proposed can achieve what is intended.

I do not have any further questions. My colleagues?

COMMISSIONER LOVELL: I think I crossed the line.

DR PARSONS: I have enjoyed it. Feel free to keep going. I can talk about bats forever.

COMMISSIONER WASLEY: Thank you, Dr Parsons. And thank you for the range of responses to obviously a number of questions.

DR PARSONS: My pleasure, thank you.

COMMISSIONER WASLEY: Mr Makgill, is there anything that you wish to add?

MR MAKGILL: Just building on what you said, it is very clear, as has been identified already in the direction, that the starting point for this is more caucusing to identify areas of agreement, disagreement, potential solutions, but as a result of that the scientists tell us what the performance objectives are.

I mean in terms of the conditions themselves there is any number of mechanisms that we can put in place to give effect to them and, as you will be aware, conditions often change over the course of a hearing, particularly when you are dealing with a technical issue like this. So I am looking for a steer from the caucusing as to what the issues are and what the objectives should be.

COMMISSIONER WASLEY: You are not the only one looking for the steer, Mr Makgill, because then when we have that then we can decide whether the caucusing then responds and addresses those matters.

MR MAKGILL: I think that, given the delay, today is to - as I understand - identify areas of agreement, areas of disagreement, and reasons why. There is plenty of scope before the section 42A report obviously returns for the ecologists to meet again and to refine those issues.

COMMISSIONER WASLEY: I am just acknowledging that, it is just a matter that is out there and on the table and we would like the responses from the caucusing and the 42A report.

MR MAKGILL: Thank you, sir.

COMMISSIONER WASLEY: Is there anything else in conclusion, Mr Makgill? Dr Parsons is you last witness?

MR MAKGILL: No, I think the time is most effectively used caucusing, sir.

COMMISSIONER WASLEY: Okay. So that concludes the hearing of all the submissions and we will adjourn in a moment and, as noted, there will be no continuation of the hearing on Thursday, so the caucusing will be undertaken, there will be the opportunity for us to issue further directions in terms of the caucusing and we will issue a direction in the very near future regarding the date for the reconvening of the hearing. So the panel this afternoon is going to agree on a date for that, subject to having some communication from Mrs Guthrie around that before we finally set it.

MR MAKGILL: Yes, and just to be absolutely clear, that day we will reconvene, I understand we will be looking to a report, recommendations and responses will be provided. I want to deliver my closing on that day as well.

COMMISSIONER WASLEY: And I take it, Mr Makgill, that that will be in writing and you will speak to that. It is intended to be pre-circulated, is that correct?

MR MAKGILL: Yes, but I will need sufficient opportunity, if I am going to pre-circulate.

COMMISSIONER WASLEY: That is fine, yes, you will have that opportunity.

Ms Mackintosh?

MS MACKINTOSH: Yes, Chair, I just thought I would mention, just in the interests of transparency, for the purpose of caucusing this afternoon we have Ms McNicholas who is going to act as scribe and note-taker. She is a 4th year law student who is currently working at Tompkins Wake part time in an admin/research role. So I just wanted to make that clear to all parties so there are no questions as to what her role and responsibilities are.

MR MAKGILL: Sir, I had a quick chat and I am sure Ms Mackintosh has emphasised this point, that her role is to record what the ecologists ask her to record so that conversation is not impeded in any way.

MALE SPEAKER: Sorry, if I may, with Conservation, I am just seeking some clarification on what experts you want to attend the caucusing this afternoon, if it was just the bat ecologists or somebody like Dr Barea who obviously has tightened the whole discussion is attending as well?

MR MAKGILL: Sir, I think it is ecologists.

COMMISSIONER WASLEY: Ecologists, yes. Okay, on that note, thank you and I would just like to acknowledge, in terms of the way people have presented, in the helpful manner, and the response to our questions, and we will see you all again in early-July and there will be that direction shortly in terms of that date in the next few days. Thanks very much.

(Adjourned)