 1   Thursday 12 May 2022

 2   (12.01 pm)

 3   LORD BRACADALE: Now, Ms Grahame, the first witness please.

 4   MS GRAHAME: Thank you. My first witness is Mr Mark

 5   DeGiovanni from Advanced Laser Imaging.

 6   LORD BRACADALE: Good morning, Mr DeGiovanni. Would you say

 7   the words of the affirmation after me, please.

 8   MR MARK DEGIOVANNI (affirmed)

 9   Questions from MS GRAHAME

10   LORD BRACADALE: Ms Grahame.

11   MS GRAHAME: Sorry, there appears to be an echo sounding

12   which -- I don't know if there is an issue with the

13   audio in the room. It is maybe me, is it?

14   A.   It's mine, I think.

15   MS GRAHAME: Is it yours?

16   A.   Yes, I can hear it.

17   MS GRAHAME: I think the plan was that we would have both my

18   microphone and Mr DeGiovanni's on at the same time. It

19   may be that that is causing the issue, so in saying

20   this, I'm hoping that those in the suite behind us will

21   be able to adapt the situation and maybe turn one of the

22   mics off to avoid the feedback. It certainly seems to

23   be getting quieter.

24   LORD BRACADALE: That is because Mr DeGiovanni is not

25   speaking, I think.

 1   A. Yes, I think if I talk --

 2   MS GRAHAME: I think this could be slightly difficult. We

 3   will resolve it first.

 4   (Pause).

 5   Thank you very much. That sounds better, thank you.

 6   I will proceed now, thank you.

 7   Good morning again. You are Mark DeGiovanni?

 8   A. That is correct.

 9   Q. And you are from Advanced Laser Imaging.

10   A. Yes.

11   Q. So are you comfortable if I use the acronym "ALI" as we

12   talk through?

13   A. Yes, we use that a lot.

14   Q. Thank you. And you are the technical director at ALI?

15   A. That is correct.

16   Q. What does that actually mean?

17   A. It mainly means that I oversee a lot of the technical

18   work that we do and I'm responsible for a lot of the

19   delivery of our products.

20   Q. Thank you. And you are based in London?

21   A. That's correct.

22   Q. And for the purposes of today, Mr DeGiovanni, you have

23   prepared a PowerPoint -- a number of slides in the

24   PowerPoint format and I intend to take you through those

25   now, if that's possible.

 1   A. Yes.

 2   Q. Thank you. So can we have those on the screen. The

 3   first slide we see says "Digital reconstruction,

 4   Sheku Bayoh Inquiry" and it has your name and that of

 5   Dave Mercel at the bottom.

 6   A. Correct.

 7   Q. Tell us who Dave Mercel is?

 8   A. David Mercel is also part of Advanced Laser Imaging. He

 9   is the technical director and again, he is similar to

10   myself, he is responsible for delivery of products and

11   helping deliver those products.

12   Q. Have you worked closely together in preparing the work

13   that you're going to discuss today?

14   A. Yes, we have.

15   Q. Thank you. And can we move on to the next slide,

16   please. This says "Methodology and process". Would you

17   talk us through the methodology that you have adopted?

18   A. So this slide really talks about the layout of the

19   presentation, so initially we're going to talk about

20   Advanced Laser Imaging and how Dave and I effectively

21   got to this point here today. After that we were going

22   to talk about the Terms of Reference, the way that we

23   were engaged by the Inquiry and how we initially became

24   involved. From there, we were going to talk about the

25   general principle of reconstruction that we have used in

       1   this case.

       2   The last three sections will be the technical

       3   details. We effectively call them the pillars of the

       4   reconstruction and they are basically the main forms of

       5   how we have been able to bring all this together and how

       6   we have developed the products for the Inquiry.

       7   Q.   Thank you very much. Let's turn on to the next slide.

       8   This is slide 3 and tell us what we see here. I see

       9   your picture, Mr DeGiovanni?

      10   A.   So this is more about effectively our history. It is

      11   one of our standard slides to explain where we're from.

      12   Previously Dave and I worked at the Metropolitan Police

      13   Service before forming ALI. In that time we worked for

      14   an area called the Computer Aided Modelling Bureau. The

      15   principal responsibility for that team was to produce

      16   reconstructions of pretty much anything and everything

      17   police-related, so there was a lot of criminal work in

      18   there, but we also extended to terrorism and others as

      19   well.

      20   Q.   And do we see there under your history section on that

      21   slide, Metropolitan Police Service and that was between

      22   2007 and 2013?

      23   A.   That is correct.

      24   Q.   And after you left the Metropolitan Police Service, tell

      25   us the sort of work that you did?

1   A.   Shall I go to the next slide or do you want me to talk

2   about --

3   Q.   Before we go to that, could I ask you -- you have listed

4   a number of inquiries and such-like there at the bottom

5   because it says Computer Aided Modelling Bureau, and you

6   have listed a number of things. Are these things you

7   have been involved with as ALI?

8   A.   No, these were as the Metropolitan Police. So one of

9   them in there is for example the Diana Inquest and it is

10   probably most relevant to what we have done to date and

11   it was one of the first cases where we utilised 3D

12   modelling and laser scanning in an inquest environment.

13   My colleague Dave Mercel in 2003 went to Paris and

14   surveyed the scene and at the time it was probably the

15   largest scene that the Met Police had ever tried to

16   attempt with a laser scanner. It was about a kilometre

17   long by 500 metres wide and it involved an underpass as

18   well as the overpass where the incident occurred, so it

19   was a significant undertaking from a survey point of

20   view.

21   At the time we didn't have the same processes that

22   we've got nowadays, so the whole scene had to be

23   modelled by hand using a digital system but it was

24   effectively modelled manually and then made into

25   a lightweight model that we could then play in live

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 1        time, in real time during the inquest.  So you will see

 2        many parallels between what I have just described there

 3        and what we have done for you -- for the Inquiry.

 4    Q.  Thank you.  Let's move on to slide 4.  Explain to the

 5        Chair what we see on this slide.

 6    A.  So since we formed Advanced Laser Imaging we have spread

 7        out from just doing police work and we do casework

 8        across a whole range of different courts and different

 9        clients as well.  So police/prosecution represents about

10        28% of the work that we have taken in the last three

11        years, but what we have noticed is that we've got other

12        work in insurance and other legal courts.

13            We have also taken on and started to work a lot more

14        for defence, police and military ombudsman and that

15        represents probably the vast majority of our work, but

16        beyond that we've got more standard surveying type work

17        in terms of digital twin reconstruction.

18            We have been involved in another inquest which was

19        a historical reconstruction.

20    Q.  Tell us about that inquest, please?

21    A.  So that relates back to the troubles in Northern Ireland

22        and we were asked to reconstruct a scene back to the

23        1970s just so that the inquest at that point could

24        understand the layout and the location of the buildings

25        that were no longer in place.
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1   Q.   The green area there, defence, police and military

2   ombudsman, you've got something mentioned there about

3   a feasibility study. What is that and what work did you

4   do in relation to that?

5   A.   So we were approached by a defence counsel and they were

6   defending a client who was accused of shooting a person

7   as he entered a vehicle. The police had carried out

8   a reconstruction with several experts where they had

9   physically got the vehicle and they had placed a person

10   in there and their conclusions were, from their

11   reconstruction, that the shot could only have been from

12   the outside of the vehicle, and they wanted to

13   understand from our perspective whether the

14   reconstruction was strong and whether what they had done

15   was correct.

16   So we went to the vehicle and we surveyed it and

17   when we compared the survey data back to the original

18   crime scene photography we noticed that the chair seat

19   had moved. What we were able to do using photography

20   which is a technique which we have used in this case as

21   well, is we were actually able to prove not just that

22   the seat had moved, but we were able to prove by how

23   much it had moved, and it wasn't just the seat moving

24   forwards and backwards, but the back of the seat had

25   been rotated back as well.

 1   We then looked at the images from the reconstruction

 2   that was done by the police's experts and we noticed

 3   that the seat position was in the same position as we

 4   had scanned it. What that meant was the seat was not in

 5   the position that it was in at the time of the incident.

 6   By showing that there was that inconsistency we

 7   understood that actually the reconstruction wasn't as

 8   sound as it was made out originally. We then produced

 9   digital reconstruction within a virtual world and we

10   then presented those results to the court.

11   Q.   So that was a comparison between the original crime

12   scene photographs showing the seat in the position at

13   the scene and then the reconstructions had been

14   completed using scans taken later of the car seat?

15   A.   That is correct.

16   Q.   And your work involved comparing the two: the seat in

17   the position at the scene and the seat later?

18   A.   That is correct.

19   Q.   Thank you.

20   A.   And then using 3D modelling to reconstruct that seat

21   back to the original position as well.

22   Q.   Thank you. Let's move on to the next slide, slide 5

23   please. Tell us what we see here.

24   A.   So the initial phrase, or the upper part of the screen

25   talks about the terms of reference -- sorry, apologies.

1   In the first contact from the Inquiry this is how we

2   were effectively requested to be involved. It was very

3   open and it was basically just asking whether we could

4   be of assistance and whether we had suitably skilled

5   contractors to help advise the Inquiry.

6   Q.   So that sets out the initial approach from the Inquiry

7   team?

8   A.   Correct.

9   Q.   And what do we see at the bottom of this screen?

10   A.   We obviously responded favourably to that because we

11   felt that fitted with us, but I think it was important

12   from both our sides, from yours and from ours, to make

13   sure that it was a good fit for each other so we had an

14   online interview with the legal and evidential team and

15   they talked us through a little bit more about the case

16   and what they were hoping to get out from the digital

17   reconstruction. We in turn replied back and talked to

18   them about the types of work we had been doing,

19   expressly the Inquiry were interested in our

20   impartiality and whether we could show impartiality in

21   what we were doing, and then from then we were requested

22   to show CVs and a list of work taken, and the CVs

23   weren't just our personal CVs, it was a business CV as

24   well.

25   Q.   And you were also asked to give a more detailed

     1   explanation of the type of work that you had been doing

     2   since you left the Met?

     3   A.   That is correct.

     4   Q.   And is that what we looked at on the previous slide, the

     5   breakdown?

     6   A.   Yes.

     7   Q.   Thank you. Could you now please look at the next slide.

     8   Talk us through what this means, "Material review", what

     9   was this about?

    10   A.   So this slide is going to build up and it's going to

    11   build up slowly in terms of our proposal to the Inquiry

    12   on how we wanted to effectively take this forward and

    13   how we felt that we could assist the Inquiry.

    14   It would start with a detailed material review. At

    15   this point, we were only aware of several documents that

    16   had been given to us but we understood there was a huge

    17   tranche of material that still needed to be looked

    18   through and understood, so before we could really get

    19   down into the detail of it we needed to have a material

    20   review of what was available to us.

    21   Q.   So you were given some initial limited information but

    22   then you required to go through the process of looking

    23   at all the information that would assist you?

    24   A.   That is correct.

    25   Q.   Explain the remainder of this slide?

1   A.   So what we then proposed, as I have mentioned before, is

2   effectively the three columns that were going to form

3   the digital reconstruction. The first is a digital twin

4   capture of the scene, so this is taking the scene and

5   making it virtual, the second is an assessment of

6   objective material and the last is an assessment of

7   subjective material, and we will cover those definitions

8   later.

9   To capture the scene and make it digital, what we

10   have done is we used three technologies and we captured

11   those all at the same time, and those three

12   technologies, from the output of those we can produce

13   a virtual model. However, that virtual model is only

14   relevant to 2021 at the time that we captured the data,

15   so what we had to do is remodel that back to 2015 and we

16   have done that using evidence that was captured, either

17   crime scene photography or a laser scan data set from

18   2015 and we have used that to remodel key elements back

19   to 2015.

20   We also wanted to add-on to that the exhibited

21   material that was captured at the scene so that we had

22   a full idea and a full picture of what the scene was

23   like at the time, and that would effectively form our

24   first product which is a cloud-accessible and

25   virtual-accessible 3D scene.

 1   Next we were looking at the objective material and

 2   here we were trying to take the timed events, such as

 3   video and audio data, and put this into a single

 4   timeline so that we could really understand when all of

 5   these events are happening within those data sets. We

 6   were going to use that in combination with the 3D data

 7   to determine people movement and vehicle involvement

 8   within the scene. In conjunction with that we were also

 9   going to assess the witness statements and put those in

10   relation to the timeline. We refer that as "temporal"

11   later in this presentation.

12   A combination of the two we hoped would let us

13   identify people based on the 3D content and the

14   statement and we hoped that that would then give us

15   a realtime video showing people and vehicle movement,

16   which would also include a 3D assessment as well.

17   Lastly, we wanted to try and understand the

18   statement information a little bit more and we refer to

19   this as the subjective material, and the aim would be to

20   identify from the source material what areas would be

21   suitable for reconstruction and then filter those down

22   to the areas that would be reconstructed, and that would

23   basically form a digital brochure, and this is basically

24   what we proposed at the start of the process.

25   Q.   So before we leave this slide, am I right in saying that

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 1          slide 6 essentially is a summary -- I don't know what
 2          that noise is.  I think we will just pause there for
 3          a second if you don't mind.  It certainly seems to have
 4          gone off.
 5             So before we leave this slide, am I right in
 6          thinking that, just for the benefit of the Chair, this
 7          is effectively a summary of where you're going to go and
 8          explain in the remainder of your slides?
 9     A.   Yes.
10     Q.   And there's three columns, the yellow, the green and the
11          blue, and you're going to deal with each in detail as we
12          go through the remainder, but if anyone wishes to look
13          back at these slides in the future, this is the one that
14          summarises where we're going.
15     A.   That is correct.
16     Q.   Let's -- that noise doesn't seem to have started again
17          so let's move on to slide 7, please.  Describe what we
18          see here.
19     A.   So when we first looked through the material we were
20          doing that material review, it became very apparent that
21          we could break the vast majority of the information that
22          was provided into what we determined as objective
23          material and subjective material.  I'm going to read
24          directly from the screen, but objective material is
25          information that is not influenced by a person's
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 1   feelings, opinions in the representation of the facts.

 2   What that means is it is things like video,

 3   photography, audio and measurements in the scene, there

 4   are things that over time will not change and will not

 5   degrade. We have also included into this column, expert

 6   investigation statements, and this is generally when an

 7   expert has given the facts about the systems that we are

 8   talking about, so there are experts that talk about the

 9   ARLS system and there are experts that then talk about

10   the mobile and extracting information from that, and

11   those we would consider as objective as well.

12   Subjective is information that is based or

13   influenced on a person's feeling, tastes, opinions or

14   experiences, so pretty much a person's memory, and into

15   that really the ones that we have used are public

16   statements and police response statements and diagrams.

17   Q.   Before we leave this slide, I want to explore this

18   distinction between objective and subjective. So when

19   we look at the green tile, the objective material, it

20   looks, from the images or the icons you have there that

21   this is recordings and audio tapes and measurements. So

22   if we're looking at the measurement between two

23   buildings, you have assumed certainly that the buildings

24   haven't moved between 2015 and 2021?

25   A.   So the 3D survey -- and just to be clear, in 2015 on the

 1   evening of the event, whilst the scene was closed,

 2   Police Scotland returned back to the scene and I believe

 3   it was a traffic collision unit came back and surveyed

 4   the scene as-is, so we have that scene captured in 3D

 5   from 2015, and that would mean that that scene -- the

 6   majority of it -- hasn't changed in terms of buildings.

 7   Q.   And that's something that you have based your work

 8   around?

 9   A.   Yes.

10   Q.   And then the subjective material, when we talk about

11   subjective, that's witnesses' perspectives or

12   recollections or that type of thing?

13   A.   Yes.

14   Q.   But you have made a distinction between the two in the

15   work that you have done and the way you have handled the

16   material?

17   A.   Yes.

18   Q.   Thank you. Let's move on to the next slide, please, and

19   this is -- this shows the first column of the yellow

20   areas, the first column of the work that you have done?

21   A.   That's correct.

22   Q.   Right. Slide 9, "Area of consideration/capture", so

23   this is the first column. Could you tell the Chair what

24   we see here, please?

25   A.   Sure. I'm just going to switch to a different system to

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 1          explain this slide a little bit clearer.  So one of the

 2          first documents we received from the Inquiry was the

 3          image that you see on the right-hand side, without the

 4          blue area attached to it, so we had this red outline

 5          that you can see, and what you can see over here is

 6          running from north to south is Hendry Road, on the

 7          left-hand side of that we have Templehall Avenue, and

 8          then to the right of that we have Hayfield Road.

 9              Two other points to note because we do reference

10          them in what we do is Arran Crescent is based over here

11          and Poplar Crescent is based just off Hayfield Road over

12          here.

13     Q.   Could I stop you there for a second, please.  I would

14          just like to confirm that the Chair and the Assessors

15          are able to see the markings that Mr DeGiovanni has

16          applied?  Thank you.  Thank you.

17              Well, thank you, that's very helpful.  So number 1,

18          you have said is Hendry Road and that's travelling down

19          the middle of the page from the top of the screen down?

20     A.   That is correct.

21     Q.   And then 2 is Templehall Avenue?

22     A.   Correct.

23     Q.   3 is Hayfield Road?

24     A.   Correct.

25     Q.   4 is Arran Crescent?
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 1    A.   That's correct.

 2    Q.   And 5 you said was ...?

 3    A.   Poplar Crescent.

 4    Q.   Thank you.  Carry on, please, you were going to move on

 5         to the area to be surveyed.

 6    A.   So once we reviewed the core material, and this was the

 7         base statements and the CCTV footage, we recommended

 8         back that the full aerial survey didn't require to be

 9         within all of this red area, and we recommended a much

10         smaller area, which is that blue highlighted area.

11    Q.   What area does the blue area cover?

12    A.   So it does cover Hendry Road, up to the two roundabouts,

13         so there's the roundabout off to Templehall Avenue, and

14         around 30 metres down Templehall Avenue.  It then runs

15         down to the roundabout with Hayfield Road and on that

16         road there is the Gallaghers public house which is also

17         included in the survey.

18    Q.   Could you point to the areas of the roundabouts that you

19         have mentioned?

20    A.   Yes, so the Templehall roundabout is over here, just

21         south of the 1 marker, and the Hayfield Road roundabout

22         is just south of that, between the 1 and the 5 lines and

23         where they meet up over here.

24    Q.   And where is Gallaghers pub in this map?

25    A.   So Gallaghers pub is just to the South West of that
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1   junction.

2   Q.   Thank you. Could we move on to the next slide, please,

3   so going back to your slides, number 10, please. This

4   is headed "3D digital twin capture", "Equipment used".

5   A.   Yes.

6   Q.   Tell us what we see here?

7   A.   So in December 2021, I attended the scene with numerous

8   other contractors and our aim was to capture those three

9   digital data sets. The first one that we're going to

10   talk about is the 3D laser scanner data set and for that

11   we used a FARO S150 laser scanner. The 150 refers to

12   the range at which the scanner operates at.

13   This is a tripod-mounted device, so it sits upon

14   a tripod and it rotates around, and as it is doing so,

15   it captures a dome of information of 3D points back into

16   the scene. The dome is defined by the third point down

17   where it talks about a 300 vertical axis and a 360

18   horizontal axis and that represents the dome of capture

19   from each position.

20   After it has captured that position, we move it

21   through the scene and we do that through the whole of

22   the area. Over a two-day period we captured 80 scans

23   across the surveyed area. The accuracy of the equipment

24   that we're using at 10 metres is 2 millimetres, and at

25   25 metres is 3.5 -- at 25 metres is 3.5 millimetres.

 1   The features that you see on the bottom of that list

 2   are basically there to help us tie all of these scan

 3   positions together so as we move this equipment through

 4   the scene, it is capturing certain -- taking more sensor

 5   information that allows us to reconstruct this back into

 6   a single point cloud.

 7   Q.   The photo on this, is that a picture of the type of

 8   scanner that you have been describing?

 9   A.   That is correct.

10   Q.   And it's on a tripod, and you have said it moves through

11   the scene. Can you help us understand what you mean by

12   that?

13   A.   So each dome of information is captured at a static

14   position and it takes about five minutes with colour to

15   capture that one position, so whilst it is capturing

16   that position that scanner does not move.

17   After it has finished capturing that position, you

18   pick the unit up, we move around 10-15 metres to the

19   next position, place it down and then restart the

20   scanner again and that means that as we progress through

21   the scene, we capture more and more information of that

22   scene, and the process then is to stitch all of that

23   together to give us an accurate 3D model of the scene.

24   Q.   And you have talked about moving it 10 metres and I'm

25   looking at the 2-millimetre accuracy at 10 metres. Is

 1   the distance that you move it determined because of the

 2   accuracy that you have?

 3   A.   That is one consideration. The other is if you move the

 4   scanner -- there are two other issues -- if you move the

 5   scanner too far then trying to register these point

 6   clouds together becomes an issue and also the further

 7   you move these apart, you get areas where there are

 8   fewer points in between these scan positions, so we try

 9   to balance the time we have available on-site with the

10   quality of the scan settings that we put on, with the

11   distance that we position the scanner and it is about

12   using -- combining those three factors together to

13   capture the scene in the best way.

14   Q.   And that's what you did here?

15   A.   That is correct.

16   Q.   And you mentioned a moment ago the dome that it scans.

17   Does that have much impact in an outdoor scene?

18   A.   Normally it is more relevant to an indoor scene,

19   especially when you're trying to capture the entire room

20   and roof areas. I just reference it because that is

21   what the scanner is capable of.

22   Q.   Thank you. Let's move on to the next tile, please.

23   Tell us what we see here?

24   A.   In a previous slide I have referred to it as a drone

25   capture, but here I refer to it as UAV scene capture.

1   They mean exactly the same thing. So an unmanned aerial

2   vehicle, or effectively a drone, is used to fly over the

3   scene and capture as many images as we can. We had

4   certain limitations that were applied upon us being able

5   to use this equipment. Because of the location to the

6   hospital and the major route that Hayfield Road is

7   running out from that hospital, in order to fly a --

8   sort of a heavier drone with a higher pixel resolution

9   we would have to be required to have control of that

10   scene which would include road closures. We weren't

11   comfortable with that because of the location, so we

12   opted to use a slightly lower resolution system but one

13   that we felt was adequate and suitable, still fit for

14   the purpose.

15   Q. How many images did you secure from that drone?

16   A. We captured over 2,500 images.

17   Q. Tell us a little bit about this level of accuracy of

18   those images?

19   A. So each image that we capture is effectively 12

20   megapixels. Generally that's still considered a high

21   quality image.

22   Q. And the concerns about the location, is that what you

23   were saying about the location of the nearby hospital?

24   A. Correct.

25   Q. Thank you. Move on to the last tile, please, and tell

 1   us what we see here.

 2   A.   So in combination to these other two elements, what we

 3   apply is a more traditional form of survey where we're

 4   actually measuring specific points throughout the scene.

 5   For that we're using a piece of equipment called an EDM

 6   and this is a -- and a GPS system, and these two systems

 7   combined are used to locate a series of points, over 500

 8   points across the scene and we're putting these onto

 9   what we call OSGB36 which is a UK mapping coordinate

10   system. The reason we want to do that is twofold. 1,

11   it allows us to put this model onto British mapping

12   coordinates system so that when we take a point on the

13   model we can reference that back to a mapping coordinate

14   and we can understand that position on another system if

15   we so choose.

16   The other reason is by capturing the survey control

17   we can use some of these points to control the entire

18   model and effectively use it as a structure to keep the

19   accuracy of the model high. The rest of the points can

20   be used then to validate the accuracy of the work that's

21   been done and the accuracy of the model.

22   Q.   So this equipment allows you to cross-check the accuracy

23   of the other work that you have done?

24   A.   That's correct.

25   Q.   And remind us what's the accuracy that you achieve with

1   this?

2   A.   This equipment, generally for the work that we were

3   doing would be between 2 and 3 millimetres across the

4   site.

5   Q.   Thank you. Would you move on to slide 11, please.

6   Describe what the Chair can see here.

7   A.   So this is an overview of the model that was generated.

8   Running from top to bottom you can see -- I will just

9   use my mouse to run over this. You can see there is

10   Hendry Road running up and down. To the South West of

11   the Hayfield roundabout you can see Gallaghers pub. If

12   we come up north of that to the other roundabout you can

13   see Templehall Avenue running left to right and then we

14   can see Hayfield Road running across from this lower

15   roundabout and then you've got the entrances to Poplar

16   Crescent on either side over here.

17   Q.   Thank you. Then moving to slide 12.

18   A.   So these are some closer images of the model just to

19   show the quality that we were able to establish from the

20   combined data set. It has picked up a remarkable amount

21   of detail within that 3D model.

22   Q.   So these are extracted from the 3D model that we saw

23   previously a moment ago?

24   A.   That's correct.

25   Q.   But they are examples of what can be done -- what can be

 1   achieved from that?

 2   A.   Yes.

 3   Q.   So what do we see on the left-hand tile?

 4   A.   So the left-hand tile is Hayfield Road and this is

 5   the -- approaching the junction with the roundabout and

 6   you can see the crossing just to the lower end of that

 7   image.

 8   Q.   Thank you. And when you say you are approaching the

 9   roundabout, is that what we can see where we see the

10   road markings on the right-hand side of that first tile?

11   A.   That is correct.

12   Q.   The middle tile?

13   A.   This is Templehall Avenue looking towards the roundabout

14   and you can see the crossing or the junction in the

15   middle.

16   Q.   Thank you. So that's from Templehall Avenue to the

17   junction at Hendry Road?

18   A.   That is correct.

19   Q.   With the Hendry Road roundabout?

20   A.   That is correct.

21   Q.   And then the third tile?

22   A.   This is Hendry Road and the -- I will refer to it as the

23   north end of Hendry Road, and this is the Shell garage

24   which is towards the edge of that data set. We also

25   have a video which outlines all of these positions.

1   Q.   Could I ask you to go back and just look at the 3D model

2   that we looked at a moment ago and just pinpoint where

3   those three images have been taken from?

4   A.   Sure. So Hayfield Road image is taken from this area

5   here.

6   Q.   That's on Hayfield Road --

7   A.   On Hayfield Road just near the junction.

8   Q.   -- near the roundabout. That was the first image?

9   A.   Correct.

10   Q.   And the second image?

11   A.   The second image is Templehall Avenue looking towards

12   Hendry Road, so the virtual camera would be around this

13   position pointing towards the roundabout over here.

14   Q.   And do we see the houses at the top of that road at

15   Templehall?

16   A.   Just here (indicating), yes.

17   Q.   Yes. And then the third image, where was that taken

18   from?

19   A.   So the third image is just showing the garage, the

20   petrol station, which is just to the north end of

21   Hendry Road which is shown over here.

22   Q.   Thank you. Could we look at those images again. Thank

23   you.

24   Can we look at the next slide, please. So this is

25   remodelling the scene and it is slide 13. Tell us what

1   we see on this slide.

2   A.   So as I previously explained, the data set that we would

3   capture -- because all the data came from December 2021,

4   the resultant model would be from 2021, so what we tried

5   to do is look at the available evidence from 2015 and

6   understand the differences between the 2021 data set and

7   the 2015 data set, and what we identified was

8   approximately between 20 and 25 areas where the scene

9   had varied.

10   Q.   So the photographs that have just come on the screen,

11   that's areas of variation?

12   A.   Correct.

13   Q.   And is that the small black circles with the red

14   exclamation mark in them?

15   A.   That is correct.

16   Q.   And could you give me an example of what you did with

17   those areas where there was that variation between 2015

18   and 2021?

19   A.   So we produced a reference document with each of these

20   variances and we supplied those to the Inquiry team and

21   we basically asked them to explain -- to tell us which

22   ones they felt were relevant for us to remodel back to

23   2015 and which ones they felt weren't relevant or

24   weren't significant enough for us to model back to the

25   2015 data set.

 1   Q.   Can you give an example of an area of variation where

 2   you were told not to change it back to what it was in

 3   2015?

 4   A.   So one of those areas is there is a fence which has been

 5   built by the Gallagher public house. It is a low fence

 6   and it doesn't interfere with the field of view of the

 7   camera and it was just felt that that wouldn't affect

 8   the understanding of the scene, nor would it contribute

 9   to anyone giving evidence, so that's something that we

10   decided wouldn't -- that the Inquiry decided wasn't

11   relevant.

12   Q.   And can you give an example or examples of areas where

13   you were asked to change the scene back to 2015?

14   A.   So two of the most critical areas that we were asked to

15   look at was the bus stop area. There has been

16   significant modelling on the pavement and where the bus

17   stop originally was, that has now been effectively

18   created as an additional pavement. What we noticed as

19   well is actually that change runs pretty much all the

20   way back to the crossing on Hayfield Road, so there's

21   been a significant change to that pavement, that

22   pavement width, from that position onwards.

23   The second area was the path which, as you can see

24   from the image above, runs from the bus stop area and in

25   2021 comes out at a crossing which is roughly mid-way

 1   between the two roundabouts.

 2   Back in 2015 that was much further south and it was

 3   nearer this red exclamation mark you can see that I'm

 4   circling here.

 5   Q.   So there were some areas identified where you were asked

 6   to remodel it back to 2015?

 7   A.   That is correct.

 8   Q.   Thank you. Would you turn to the next slide, slide 14

 9   please. Tell us what we see here.

10   A.   So this is basically the remodelled scene. So we have

11   taken the majority of the 2021 data set, but in those

12   two areas -- so the bus stop as you can see, now we have

13   reconditioned that back to the 2015 data set, and you

14   can actually see the line work has been reconstructed as

15   well.

16   Additionally we have reconstructed the path which

17   runs much closer to the tree line on the edge of

18   Hayfield Road and we also were able to bring back some

19   of the trees that were removed at the time of

20   undertaking this work as well.

21   Q.   Thank you. Can we turn to the next slide please, or

22   yes, tell us what this shows.

23   A.   So here we have just got some more visuals of the model

24   and where -- from closer-in angles, just to view

25   effectively what's been created. On the left-hand side

 1   again you can see the pavement area of the bus stop has

 2   been reconstructed.

 3   On the right-hand side you can see that we have

 4   reconstructed the path, as I say, a lot closer to the

 5   junction.

 6   Q.   So looking at the left-hand side tile, we see the bus

 7   stop on Hayfield Road?

 8   A.   Correct.

 9   Q.   And that's looking towards the roundabout with

10   Hendry Road?

11   A.   That's correct.

12   Q.   And we see the vehicles on the left-hand side of

13   Hayfield Road?

14   A.   Yes.

15   Q.   And then on the right-hand side tile that we see on this

16   screen, this is taken from Hendry Road?

17   A.   That is correct.

18   Q.   Looking towards the path that leads to Hayfield Road?

19   A.   Again, that's correct.

20   Q.   And on the right-hand side of that tile we can see some

21   of the road markings that indicate the roundabout on

22   Hendry Road?

23   A.   Yes.

24   Q.   Thank you. The next slide, please. What do these

25   images show?

1   A.   So as I previously mentioned, in 2015 Police Scotland

2   captured the scene with their own device, I believe it

3   was a Leica P20 and they captured the area from three

4   locations, so it wasn't a significant capture of the

5   area but it did cover the critical area that was

6   cordoned off.

7   That data was very useful because it captured

8   information within that scene that otherwise we would

9   have had to reconstruct back from photography.

10   Q.   So these four images are -- well, view 1 from

11   Hendry Road junction to Hayfield Road?

12   A.   Correct.

13   Q.   View 2, which is at the bottom left-hand side of the

14   screen, is from Hayfield Road towards the junction with

15   Hendry Road?

16   A.   That is correct.

17   Q.   And then view 3 is an overview of Hendry Road and

18   Hayfield Road junction?

19   A.   Yes.

20   Q.   And view 4, bottom right-hand side of the screen, is an

21   overview of Hendry Road and Hayfield Road junction?

22   A.   Yes.

23   Q.   It looks --

24   A.   Can I just explain just one thing on this as well?

25   Q.   Yes.

 1   A.   You will notice that on this image 4, the data goes from

 2   being quite well coloured to being almost black. The

 3   reason for that is these scans were done late in the

 4   evening, so they were done I believe around 10 o'clock

 5   at night, and the reason obviously that's black is

 6   because at that point the onboard camera would not pick

 7   up any light source, so that's just to explain why that

 8   looks the way it does, but the most important thing is

 9   the 3D data that it captured was still accurate because

10   this -- the way this system works, it works in all

11   lighting conditions.

12   Q.   So even though it was dark you could still get the data

13   from this scan?

14   A.   Correct.

15   Q.   And we see on these images -- we see the bottom, the

16   final view, view 4, it says:

17   "This image is produced by 3D laser scan data

18   captured by Police Scotland on the evening of

19   3 May 2015."

20   A.   That is correct.

21   Q.   Thank you. Let's move on. Tell us what we see here.

22   A.   So this slide explains how we utilised that 2015 data

23   set. On the left-hand side you can see that we have

24   positioned these yellow paper clips. What these

25   represent is exhibit markers that were placed in the

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 1            scene by the officers that have been captured by the
 2            laser scan data.  So what we're able to do is reposition
 3            those markers accurately back into the scene to their
 4            exact location that they were in 2015, and we're able to
 5            do that because of the data set that was provided to us.
 6    Q.      And those are the yellow evidence markers that we see
 7            with numbers on them?
 8    A.      Correct.
 9    Q.      Thank you.  What do we see on the right-hand side of the
10            screen?
11    A.      So on the right-hand side we see again the 2015 laser
12            scan data set, and what highlights here is the vehicles
13            that were captured.  The scene was closed early that day
14            and the scene was kept closed through the whole day, so
15            what we know is that the vehicles that we see positioned
16            in here were positioned at the same time during
17            the police response, so it allows us to be able to
18            understand not only the makes and the types of the model
19            but also to reposition them back into the scene into
20            their exact location that we were again at the time of
21            the restraint.
22    Q.      When you say the makes and models, did you do any
23            additional work to identify the shapes and --
24    A.      So yes, where we could, we identified licence plates
25            from the crime scene photography, and then we used that
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  1   with the DVLA database to try and understand the make

  2   and model of each vehicle. Where we couldn't purchase

  3   a specific model type to be able to put into the scene,

  4   we took one which was as close to the actual one that we

  5   could find, but generally we made sure that it would

  6   match in general shape, size and appearance.

  7   Q.   Thank you. Can we move on to slide 17, please. This is

  8   headed "Knife location". Talk to us about this.

  9   A.   Not all of the exhibited information was captured in the

 10   laser scan data because some of it was removed prior to

 11   the laser scan data taking place. A key element, or one

 12   of the key exhibits for this would be the knife and

 13   this -- the only evidence that we really have about the

 14   location of the knife is this one image, which I believe

 15   was captured by Connell --

 16   Q.   DC Connell?

 17   A.   DC Connell on his mobile phone. So because of that we

 18   wanted to try and understand its exact location in the

 19   scene and we wanted to do it using a more scientific

 20   technique, so we introduced a technique called

 21   photogrammetry. More precisely it is known as laser

 22   scan assisted photogrammetry, and this is where we're

 23   using points and common points between a laser scan data

 24   set and an image to be able to understand the parameters

 25   of that camera. That would include the position, the

 1   orientation and the lens distortion coefficients that

 2   define where and how that camera projects back into the

 3   scene.

 4   What we can then do is we can then use the laser

 5   scan data to outline the position and locate that knife

 6   back into the scene.

 7   Q.   And that's the work that you carried out in relation to

 8   this one image of a knife at the scene?

 9   A.   Correct.

10   Q.   And when we say the scene, this is an image of

11   Hayfield Road, or part of Hayfield Road?

12   A.   That is correct. I think just this last image as well,

13   because we're working within the laser scan data set

14   when we're doing the analysis, it means that the knife

15   location that we identify within the photogrammetry is

16   also the knife position within the 3D model that we have

17   established, and that also ties into the mapping

18   coordinates that we talked about earlier.

19   Q.   And the window or the tile that has just appeared at the

20   bottom right-hand side of the screen shows Hayfield Road

21   and we can see a white outline which is the knife?

22   A.   Correct.

23   Q.   And why is there a red exclamation mark circle next to

24   that?

25   A.   Literally that was just a note that was placed in there

1   so that in the 3D model I can click on that and it will

2   just show me an image of the knife, that's all.

3   Q.   Thank you. Moving on to the next slide, please. This

4   is slide 18. You're going to demonstrate the

5   interactive 3D scene now.

6   A.   Correct.

7   Q.   Just briefly talk us through this image first of all.

8   A.   So I hope by now with the work we have done with the

9   maps you can start to understand the 3D model and the

10   layout that we're talking about. So from north to south

11   we have Hendry Road. The more northerly roundabout

12   leads off to Templehall Avenue and the south roundabout

13   leads to Hendry Road --

14   Q.   Hayfield?

15   A.   Hayfield Road, my apologies.

16   Q.   Not at all. Hayfield Road.

17   A.   Hayfield Road, and again, we've got the entrances to

18   Poplar Crescent along that road.

19   Q.   And show us Gallaghers pub on this?

20   A.   So Gallaghers pub is in this corner here.

21   Q.   Thank you.

22   A.   And what I can do is I can come into this model and we

23   can take a closer look.

24   Q.   So you are zooming in now into the model?

25   A.   Correct. So the model is designed to work over the

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 1          cloud, so effectively what that means is as we move into

 2          an area the model will refine and it will load more

 3          detail as it needs to to fill in the gaps.

 4     Q.   And you are showing us on the screen Gallaghers pub?

 5     A.   Correct.

 6              We can go up as well and we can have a look at

 7          Templehall Avenue and here we see the first junction.

 8     Q.   And is this the area where we saw a slide previously

 9          actually (inaudible)?

10     A.   Correct, yes.

11     Q.   And that was on Templehall Avenue looking towards the

12          roundabout with Hendry Road?

13     A.   Yes.

14     Q.   And we can see the markings on the road near the

15          roundabout.

16     A.   Yes.

17     Q.   Thank you.

18     A.   We can go up and just quickly show the north extent of

19          the model which includes the Shell garage.

20     Q.   Yes.  And that's on Hendry Road?

21     A.   Correct.

22     Q.   And then can we look in the other direction down

23          Hendry Road.  Thank you.  And then would you perhaps

24          show us Hayfield Road.

25     A.   Yes.  So as you can see, the model loads as we move into
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 1   those areas.

 2   Q.   Okay. Maybe you could pause there for a moment. So

 3   we're seeing a view from the roundabout at Hendry Road.

 4   Gallaghers pub is behind this point in the road and

 5   we're looking down along Hayfield Road?

 6   A.   That is correct.

 7   Q.   With the houses on the right?

 8   A.   That is correct.

 9   Q.   And the bus stop in the distance on the left, and we can

10   see the path that leads between the trees?

11   A.   Yes.

12   Q.   And those are the areas that you have highlighted

13   earlier?

14   A.   Yes.

15   Q.   And on this screen on the left-hand side of that road we

16   can see the red exclamation mark. Is that where the --

17   A.   That is correct, and as we open that up, we can see just

18   an image -- a cropped image of the knife location.

19   Q.   Thank you. And we see those yellow paper clips on the

20   right-hand side?

21   A.   Again, these are the exhibit labels, as previously seen.

22   Q.   Thank you. And as part of this interactive scene, is it

23   possible to insert characters into this scene?

24   A.   Yes, yes, absolutely.

25   Q.   Could you demonstrate that, please?

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 1    A.   So we call this a line of sight tool, and it allows us

 2         to select a point within the scene.  We can give them

 3         a gender, we can choose a posture between just standing

 4         and kneeling, and we can either use a generic height,

 5         which is average, 95th percentile and 5th percentile, or

 6         we can give a custom height within this area.  I'm just

 7         going to make this person blue so he sticks out.

 8    Q.   So you have used a drop down menu to create a character

 9         who can be inserted into the scene?

10    A.   Correct.

11    Q.   And you have placed a blue person now, male 1, next to

12         a lamp post on Hayfield Road at the roundabout with

13         Hendry Road?

14    A.   Yes.

15    Q.   Thank you.  Are you able to move that person around

16         or --

17    A.   Yes, so we can move this person within the scene, so we

18         can rotate and translate him and I could, for example,

19         rotate him around to face the bus stop area.

20    Q.   So we now see the blue person in the scene looking down

21         Hayfield Road?

22    A.   Correct.

23    Q.   Towards the bus stop area?

24    A.   Correct.

25    Q.   And if we wanted to calculate the distance between the
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 1   bus stop area and where the person is standing in the

 2   scene, is that something you're able to do?

 3   A.   Yes, so what we're able to do, for example, is I can

 4   take a view where I can see my figure and the bus stop

 5   and we can apply what we call a polygon measurement. We

 6   can go from the position of the male and we can take

 7   a general location to approximately near the bus stop

 8   and that would give us a figure of 65 metres in this

 9   case.

10   Q.   Right. And the measurement we see there is always going

11   to be in metres?

12   A.   Correct.

13   Q.   And does this allow you to calculate a number of

14   measurements at one time on the screen?

15   A.   Yes, and these can range from point-to-point, or we can

16   understand the height of an object, or we can understand

17   information about angles, or areas even.

18   Q.   When you say angles, would you explain what you mean by

19   that?

20   A.   Not entirely sure whether it's something that would be

21   used, but what it allows us to do is, for example, we

22   can select three points within the scene and that will

23   give us an angle to each of those three points to

24   understand that angular information.

25   Q.   Is it also something -- is it possible to work out the

1   difference in height between certain items?

2   A.   Yes, so, for example, if I wanted to understand the

3   height of this lamp post, we've got a specific tool that

4   allows us to take a top and bottom measurement and it

5   will only provide the height of that specific object

6   between those two points, so it ignores effectively the

7   X, Y coordinates and just shows you the height.

8   Q.   Thank you.

9   Would you now, please, move on to your next slide,

10   slide 19.

11   LORD BRACADALE: Ms Grahame, I wonder if this might be

12   a good point to stop for lunch.

13   MS GRAHAME: It would be.

14   LORD BRACADALE: Very well. We will stop now and sit again

15   at 2 o'clock.

16   (12.59 pm)

17   (The luncheon adjournment)

18   (2.00 pm)

19   LORD BRACADALE: Ms Grahame.

20   MS GRAHAME: Mr DeGiovanni, I forgot to ask you something

21   before we left the interactive 3D scene. I understand

22   you now have that back up on the screen for me.

23   Another function that this interactive scene has --

24   I would like you to demonstrate to the Chair the line of

25   sight function, please.

 1   A.   So one of the features that we can do within the

 2   software platform is once we have created one of these

 3   line of sight characters is I can double click on the

 4   character and it goes to his line of sight. This is

 5   taken at his eye position, based on the height of the

 6   person that we put in when we created the character, so

 7   if we effectively said the person was 1.73 metres high,

 8   it would be around 5 centimetres below that to capture

 9   that person's eye height in looking into the scene.

10   Q.   So this is an average line of sight?

11   A.   Correct.

12   Q.   Yes. Thank you very much. And what we see here on the

13   screen now is an image that's created from the line of

14   sight of the blue character, male 1, which you had shown

15   us on Hayfield Road near the roundabout with

16   Hendry Road?

17   A.   Correct. I think just to add on top of that, this isn't

18   to say this is a human vision view, this is

19   a reconstructed view of that eye position, and that's

20   a very important clarification.

21   Q.   Thank you. Then I would like you -- before we move on

22   to slide 19, would it be possible now to show the

23   overview which has been prepared?

24   A.   So this is a digital animation through the 2021 data set

25   and we basically start with a mapping of Kirkcaldy going

 1   into the area of interest.

 2   Q.   And at this point can you pause it, please, so that we

 3   can talk through this area. Thank you.

 4   This has zoomed into an area in Kirkcaldy and again,

 5   there's a red box that we can see on the left-hand side

 6   of the screen and describe what we see there?

 7   A.   So the road over here is Arran Crescent and we

 8   highlighted that before on the first mapping slide that

 9   we talked about.

10   Q.   And again, can you highlight Templehall Avenue?

11   A.   So the road, again, running to the left, east to west or

12   west to east, is Templehall Avenue.

13   Q.   And Hendry Road?

14   A.   Running north to south (inaudible) past the junctions.

15   Q.   And Hayfield Road?

16   A.   East to west on the right side of that junction.

17   Q.   And where was Gallaghers pub?

18   A.   Gallaghers pub is -- again is --

19   Q.   I don't need this circled at this stage, thank you.

20   A.   It is this building right here.

21   Q.   Thank you very much. Please carry on playing the

22   overview. And would you talk us through this as we go

23   through the video, please?

24   A.   Yes. So we have zoomed into the area of survey. What

25   you see here is what we call a point cloud which is

1   basically the -- it's the same model that you have seen

2   before, but instead of being made what we call out of a

3   mesh, which is edges and faces, it is made up of

4   millions and millions of points.

5   As you can see, it is a 3D representation of the

6   scene, but it is an accurate 3D representation of the

7   scene and, as previously explained, this all fits onto

8   mapping and it does so because of its accuracy. What we

9   have now done is we have rotated round to

10   Templehall Avenue and we're just going to go into the

11   junction. What you can see is there is a crossing and

12   this is the first sighting of a male in a white T-shirt

13   that's referenced within the CCTV, or the video footage.

14   We're then going to go along to Hendry Road and

15   we're going to go to the north end of that data set and

16   this is going to show the Shell petrol station and again

17   we get a clip from the dash cam footage that you will

18   see later.

19   We're now going to go down to Gallaghers pub, so

20   we're following down Hendry Road and here is Gallaghers

21   pub.

22   As we rotate around Gallaghers pub you're going to

23   see there's an extension to the carpark side of it.

24   This extension is where the CCTV camera was placed that

25   we can see the majority of the events which occurred.

 1   I'm just going to take a view just behind that just to

 2   give a general appreciation of what that camera would be

 3   looking into.

 4   Moving now onto Hayfield Road, we're going to show

 5   and highlight the area of the knife and the location of

 6   that.

 7   From the Snapchat footage, the area of restraint is

 8   highlighted, as you can see here, and it is near the

 9   crossing just across Hayfield Road.

10   We have two properties which are of significance

11   because there are civilian witnesses that make

12   observations from within those two buildings. And just

13   highlighted here is the bus stop which I'm sure you will

14   probably hear reference to, specifically where police

15   vehicles were parked and what happens around that area.

16   Moving up, you can see Poplar Crescent -- I will

17   just pause that. You can see Poplar Crescent just to

18   the side over here, and this is the furthest we see the

19   person in the white T-shirt down Hayfield Road in the

20   video footage.

21   So it just gives you an overview of the scene in 3D,

22   it relates it back to the mapping and gives you

23   a general idea of what you can see.

24   Q.   And we're calling that the overview, the scene overview?

25   A.   Yes.

1   Q.   Thank you. Could we go back now, please, to slide 19

2   and we were just about to come onto that. This is the

3   second column of the work which you did for the Inquiry.

4   A.   Correct.

5   Q.   And then turn on to slide 20, and this is entitled

6   "Timing of video/audio" and "Objective assessment"?

7   A.   So what we were trying to do here is assess the video

8   and the audio and we wanted to try and place this onto

9   what we call as a real time clock. The real time clock

10   is the time that people were working to at the time,

11   which I believe was British Summer Time, so it would be

12   an hour difference to Greenwich Mean Time. So that was

13   the timing that we're trying to get all of the audio and

14   all of the video aligned to exactly the same time.

15   Out of all the information we had, some of the

16   footage we were given very precise information as to the

17   timing and how that related to the real time and that

18   included the Gallagher public house footage where

19   officers went and they used a technique called the

20   talking clock to determine the difference between the

21   camera time or the CCTV system time and the real time.

22   The 999 and 101 calls and the Airwave calls are all

23   recorded accurately on the systems.

24   We then have a series of Snapchat images or Snapchat

25   videos that were captured on a mobile phone. We refer

 1   to these as partially timed events because we were given

 2   some information which allowed us to constrain the time

 3   at which these were applied, but we don't have their

 4   exact time.

 5   Lastly we have what we have defined here as unknown

 6   timed event. Now, some of these cameras have time codes

 7   upon them but what we're saying here is we don't

 8   actually understand how that time code relates to the

 9   real time, we've got no reference whether they are fast

10   or slow or by how much, and because of that, we put them

11   in the unknown timed event.

12   Q. So you were supplied with a number of different items

13   but all the times were different?

14   A. Correct, and that's because they all come from different

15   systems, and each system has its own digital clock so

16   it's operating on a different time.

17   Q. How did you resolve that conflict?

18   A. So if I move to the next slide. It was a matter of

19   processing each video with the information I had

20   available. We have over here the Harry Kolberg dash cam

21   footage. What makes this particularly interesting is

22   between Harry and Robson they make two phone calls to

23   999, both are audible within the dash cam footage. What

24   that allows us to do is time the dash cam footage to

25   within a second of the real time clock, so we're able to

1   bring this footage from an unknown time into real time.

2   Q. Is that because the 999 calls you can accurately

3   identify the time to within 1 second?

4   A. Correct.

5   Q. Thank you.

6   A. We also decided to undertake a validation of the

7   Gallaghers CCTV public house footage. Even though we

8   were given officer statements as to the time difference

9   and whether it was fast or slow, we wanted to validate

10   it because this video for us was critical, and making

11   sure that there were no human errors or mistakes in

12   doing that process for us was really important.

13   So what we took as a common point between the dash

14   cam footage and the Gallaghers' CCTV footage and we used

15   that as a time of comparison between the two. From that

16   we were able to independently verify that the

17   police officers had conducted a good review of the CCTV

18   and their timing was accurate to within tolerances that

19   we could measure.

20   Q. What was that common point?

21   A. So the common point we used was the braking and stopping

22   of Harry Kolberg's vehicle within the dash cam footage

23   which can also be seen in Gallaghers' CCTV footage by

24   his brake lights.

25   Q. I know we will come to this later, but can you please

1   indicate on this -- the middle tile that we see -- where

2   you were able to identify Harry Kolberg's vehicle?

3   A.   So we're looking at this area just here (indicating).

4   Q.   And that's from Gallaghers' CCTV?

5   A.   Correct.

6   Q.   And you cross-checked that with the dash cam footage?

7   A.   Yes.

8   Q.   To align the two?

9   A.   Correct -- yes, temporally, so by time.

10   Q.   By time. Carry on, please.

11   A.   So we talked about the Snapchat footage having some

12   constraints. With Snapchat what happens is the video is

13   deleted within a certain period of sending them, so the

14   videos that were originally captured were no longer

15   present on Ashley Wyse's phone when it was examined.

16   However, the person examining the phone was able to

17   retrieve what we call thumbnail cache data. Thumbnails

18   are small files that are created after a video file or

19   after a large image is generated and its aim is

20   basically to allow a computer system to understand

21   a fold structure very clearly and show a visual

22   representation back to the user.

23   Because we know that this file was created after the

24   creation of the video, it helps us understand an end

25   constraint to when these videos could have occurred. So

1   we understood that we had the last point at which these

2   videos could occur, and we could start to work backwards

3   from that position.

4   Two of the videos occurred very soon -- the

5   thumbnails were generated very soon after the creation

6   of the video and we know this because there are common

7   features between the Gallaghers pub footage and the

8   Snapchat footage which could only have occurred at those

9   times.

10   The other footage that wasn't that -- that wasn't

11   aligned within a few seconds, there were very, very

12   clear differences in the number of police vehicles and

13   the number of officers on the scene that they were

14   occurring at a significant time period before of about 2

15   to 3 minutes.

16   So to analyse that information we had to refer more

17   back to exact common features between vehicles,

18   police officer positions and that allowed us then to

19   locate and understand the location and the timing of

20   that event as well.

21   Q.   So you were cross-checking each of those items with

22   other information that you had?

23   A.   Correct. And in each case there was only ever one time

24   that they would match, so it was very specific to when

25   we could actually put them in the right temporal place.

 1   Q.   Thank you.

 2   A.   The other unknown footage was there's a van driving

 3   through the vehicle and Robson Kolberg's iPhone footage.

 4   Both of these events occur and are very clearly visible

 5   within the dash cam footage, so we've got very clear

 6   common events occurring between those two events and the

 7   dash cam footage to be able to align those as well, so

 8   what it meant is that all of these elements could be

 9   aligned and put together to the real time clock.

10   Q.   Thank you. Let's move on to the next slide. This is

11   slide 22. Tell us what we have here.

12   A.   So we mentioned before a GPS data set which is called

13   ARLS. It stands for automatic resource location system.

14   It is part of the radio systems that are carried by

15   police in the vehicles and on their handheld units and

16   what these units can do is under certain conditions they

17   are able to store and -- or capture their GPS location

18   and they're able to send that and get stored by the ARLS

19   system.

20   What you see here on the left-hand side is the CSV

21   output or a spreadsheet-type output of the data that

22   gets stored. On the right-hand side is that information

23   plotted out as a series of points.

24   What was interesting about this that we felt we

25   could utilise is the fact that we not only had the time

 1   and date but we also had the latitude and the longitude

 2   of each of those points as they were captured for each

 3   of those units. What that allowed us to effectively do

 4   is create an animation of units as they moved through

 5   the scene. There is some caution when doing this and

 6   I need to explain to you the assumptions and the

 7   accuracies that we are working to.

 8   Firstly, the ARLS system uses GPS1. In an exterior

 9   setting, that is up to 5 metres of accuracy. However,

10   that can be significantly worse if the unit is either

11   indoors or in heavily built-up areas. This is due to

12   reflections of the unit which would cause significant

13   errors going into tens of metres or even higher.

14   We also have to understand that every single time

15   the GPS records a signal, it is like it happens in

16   a millisecond, and that happens either every 5 minutes

17   or every 200 metres that vehicle travels. In order to

18   show this and visualise it we considered linear transit

19   between the points. What that means is that what we're

20   showing here is indicative movement of the vehicles from

21   one position to another. It is not the exact position

22   or location of a vehicle. What we do not know is if

23   that vehicle or that person held still for half a minute

24   then walked across and then stopped for 3 minutes and

25   then it picked up that signal; we do not have that level

1   of accuracy.

2   The last thing to bear in mind is that several

3   vehicles did not have ARLS working effectively in their

4   vehicles at all and several people did not have entries

5   for their ARLS data at the start of the event, so it's

6   just to understand that this is not a complete picture

7   of every officer, it's the most complete picture we can

8   do with the available evidence.

9   Q.   Two things. When you use the word "Unit", does that

10   mean a vehicle or could it mean something else?

11   A.   It could also refer to a person's handheld unit as well.

12   Q.   Like a radio, a police radio?

13   A.   Correct.

14   Q.   And you have created this, this is demonstrating where

15   the data is and how it moves between two points?

16   A.   Correct.

17   Q.   Thank you. Moving on to the next slide, this is

18   slide 24. Tell us what we see here.

19   A.   So the last element that we wanted to look at within

20   this area is tracking of people and vehicles from the

21   available footage that we had to us. So the most

22   complete record of what can be seen is from the

23   Gallaghers public house footage. What we wanted to do

24   is again use that footage to understand this movement of

25   when vehicles arrive and the movement of people within

 1   that scene, so we have taken the original footage and

 2   very similar to what we did when we allocated the knife

 3   we used the same technique to understand the location of

 4   Gallagher pub's footage and the camera position.

 5   We then carry out a process -- and I want to just

 6   remind you that we picked out three elements from doing

 7   that analysis: the position, the orientation and the

 8   lens distortion coefficients.

 9   What we are able to do is create a video where we

10   remove those distortions. That's important because when

11   we then start to model and we start to move vehicles

12   within the scene we can then start to understand that

13   position more accurately without lens distortion

14   affecting the analysis or the positioning.

15   The things that we have to bear in mind with this

16   analysis is the resolution of the CCTV from that footage

17   is very low; it is not high quality footage.

18   The other thing to bear in mind is we are observing

19   people and vehicles at distance. We can say that the

20   vehicle positions are accurate because we have done

21   further analysis on the Snapchat footage which is of

22   higher quality and closer up. That allows us to

23   position the vehicles very, very -- to a high degree of

24   accuracy. However, they only occur for short periods of

25   time, so understanding people movement beyond the extent

 1   of the Snapchat footage is not possible.

 2   What I want people to bear in mind is that when we

 3   do position people within the scene, they are indicative

 4   only because of these effects and because of the

 5   tolerances that we were able to achieve with this data.

 6   Q.   Thank you. Slide 25.

 7   A.   So here we see an animation and it shows a vehicle

 8   coming in. I'm just going to pause it here.

 9   We have represented all people within the scene as

10   blue cylinders. The reason for this is because we are

11   not trying to identify people within this. We cannot

12   identify even from Gallaghers' footage, the footage is

13   not clear enough, but where we can understand a person's

14   position and their movement they are represented by

15   a blue cylinder.

16   Q.   And can you show us that blue cylinder on the screen?

17   A.   Sure (indicating).

18   Q.   Thank you.

19   A.   I also want to reference this red zone here. Again, due

20   to the quality of the Gallaghers pub footage, when there

21   are multiple people in very close proximity to each

22   other we cannot identify or differentiate between them.

23   The number of pixels that we are able to pick or

24   understand are just too low for us to be able to

25   understand and actually determine floor positions and

 1   individual people movement, so in that area,

 2   specifically the area of restraint, we will not be

 3   identifying using the Gallaghers' footage to understand

 4   people location.

 5   That does change very slightly for the Snapchat

 6   footage.

 7   Q. Thank you. Again, on the screen we can see another blue

 8   dot or a blue cylinder, and that's indicative of

 9   a person moving.

10   A. Correct.

11   Q. And another car has entered the scene from Hendry Road?

12   A. Yes.

13   Q. So this is an example of part of the reconstruction work

14   that you have completed?

15   A. That is correct.

16   Q. Thank you. Let's move on to the next slide, slide 26,

17   and I think at this point you're going to demonstrate

18   part of the evidence video timeline. If we can stop

19   there, do we see -- oh, sorry, can I ask you to go back

20   slightly. We see that it is the evidence video

21   timeline, "Video and audio assets positioned in real

22   time", so this is cross-referenced with a real time

23   clock?

24   A. That is correct.

25   Q. And it is from 7.09 in the morning to 7.41 and 28

 1   seconds.

 2   A. Yes.

 3   Q. And you have also noted, quite properly, that this is

 4   a shortened version which has been redacted for public

 5   display.

 6   A. Correct.

 7   Q. Thank you. Carry on to the next part of this, please.

 8   Now, this is a note, and I wonder if you could explain

 9   to the Chair why this appears.

10   A. We want to make sure that when people are viewing this

11   they understand what they are seeing and why we have

12   created it. What you're going to see is all of the

13   audio and all of the video together on one screen at one

14   time. What that means is in order to show the areas

15   that are critical, some of the videos have been cropped

16   and zoomed into, so that we're only looking at the areas

17   of action or of relevance to what -- to the incident.

18   The other thing to bear in mind is several of the

19   audio assets, specifically the 999 and 101 calls,

20   overlap with each other; they don't happen one after

21   another, they happen all at the same time. In order to

22   understand or make sense of that, what we have done is

23   at the start of each phone call you will hear the phone

24   call played at full volume. After a few seconds that

25   volume will drop to a background noise and allow for

 1   a second phone call to come into play so you can

 2   understand the start of each phone call. You are not

 3   expected to understand what happens when multiple phone

 4   calls are being said at the same time. To do that you

 5   can always refer to either the 999 transcript which has

 6   been created, or you can refer to the individual audio

 7   assets that are available.

 8   Q.   Let me just pause there for a moment, please. I wonder

 9   if now might be an opportunity to look at those 999

10   transcripts. There's a document which has been created

11   in relation to those. Could we turn to that?

12   So this is "SBPI00082-999 transcript". And tell us

13   what we see on the screen.

14   A.   So I believe the transcripts were done by PIRC and they

15   provided the text for each 999 call that came in,

16   basically talking through what they can hear and what we

17   have added to this is using the real time clock

18   effectively the start time and if we go to the end of

19   each conversation you will see an end time at which

20   those conversations started and ended and that's from

21   when we hear that first phrase to when we hear that last

22   phrase.

23   Q.   So can we look at the beginning, the first page please.

24   Do we see at the top it says "Harry Kolberg-1st call"

25   and the time is given as 07.10 and 14 seconds?

1   A.   That's correct.

2   Q.   So that's when that call started in the real time and

3   then towards the end of that call, can we look down, we

4   will see that that goes on to 07.12.16.

5   A.   Yes.

6   Q.   And then go on to the next one. That started at

7   07.10.16 and goes on to 07.10.45.

8   A.   Yes.

9   Q.   And that's for Simon Rowe, so again, there's an overlap

10   there.

11   A.   Correct.

12   Q.   Thank you. I don't need you to go through that in any

13   more detail, we will be dealing with that later. So

14   that's a separate item that is available but in this

15   footage which you have prepared, the enhanced video

16   timeline, all the calls come in into the footage at the

17   real time that they were made.

18   A.   Correct.

19   Q.   And that's why there's an overlap.

20   A.   Yes.

21   Q.   Thank you. Then move on to the remainder of the note

22   please. Was there anything else that you wanted to add?

23   A.   I think obviously with creating a report which will be

24   made available, I think we're just going through some

25   legal redactions and making sure that it is suitable to

 1   be released into the public. As soon as that has been

 2   done, again, when reviewing this footage we ask to take

 3   the consideration of the effort and what's been put in

 4   and the limitations of what we have produced just as we

 5   have discussed here in this forum.

 6   Q.   So in addition to your evidence here today there's going

 7   to be a report which as I understand it sets out in much

 8   more detail the evidence that you have given in relation

 9   to the slides today --

10   A.   That's correct.

11   Q.   -- and the work that you have done?

12   A.   Yes.

13   Q.   And that will be made available in due course.

14   A.   Yes.

15   Q.   And just to confirm, Mr DeGiovanni, you have agreed to

16   return to the Inquiry and give further evidence if

17   that's required towards the end of this hearing?

18   A.   That is correct.

19   Q.   Thank you. Can we watch this excerpt of the footage,

20   please, and if we start the screen, if you don't mind,

21   and you could perhaps explain what we see on the screen

22   at the outset.

23   A.   So I'm just going to pause it here. So in the top

24   right-hand corner it says "Real time".

25   Q.   Left, I think.

1   A.   In the top left-hand corner.

2   Q.   Your other right!

3   A.   Yes. There's the real time clock and this is, as we

4   have discussed already, the British Summer Time, time of

5   the event. Below that you will see there are three

6   buttons: there's 101 calls, 999 calls and Airwave calls.

7   These are effectively buttons that when a 999 or a 101

8   call or an Airwave message is transmitted, they will

9   light up so it gives an idea or an indication when those

10   are coming through.

11   What you will see below that -- and we refer to

12   these as tiles -- effectively each video will come in as

13   a tile that you can see. As you see this video is

14   labelled as "PIRC-01293-dash cam footage".

15   Q.   So we can see at the bottom of that dash cam footage it

16   is 3 May 2015 and the time given on that dash cam

17   footage is 08.10.18, but through the work you have done

18   your real time clock on the top left says it is 7 in the

19   morning, 9 minutes past 7 and 1 second.

20   A.   That's correct.

21   Q.   Thank you.

22   (Video played)

23   Could we pause it there for a second, please. We

24   see that on the left-hand side for the dash cam footage

25   it now says "Footage not available". Why is that?

 1   A.   When we reviewed the dash cam footage available, the --

 2   basically for every minute of footage played there was

 3   approximately a 10-second gap in the recording. One

 4   possible reason or explanation for this could be that

 5   the system was buffering and then trying to save the

 6   information before running or recording the next minute,

 7   but it was consistent throughout the footage and

 8   consistent in all versions of the dash cam footage that

 9   we were supplied with, so it certainly seems to be

10   a limitation of the hardware that was used at the time.

11   Q.   So at this stage we can see that the 101 call button has

12   been -- it has lit up effectively.

13   A.   Yes.

14   Q.   And on the right we have seen the introduction of the

15   CCTV from Gallaghers pub?

16   A.   Correct.

17   Q.   And this is all happening at 7.10 in the morning on

18   3 May 2015, and 4 seconds.

19   A.   Yes.

20   Q.   Thank you. Please carry on.

21   (Video played)

22   Can we stop that there for a moment, please. So we

23   see that on this screen it is 7.11.02. The 999 call

24   button is highlighted and we also see that the

25   reconstruction tile that you mentioned in the earlier

1   slide has now appeared at the top of the screen, so this

2   is showing three things: the dash cam, the CCTV and the

3   reconstruction tile from 7.11.

4   A.   That is correct.

5   Q.   Thank you, carry on.

6   (Video played)

7   A.   Just to explain that, we have moved on slightly in the

8   timeline. As I say, this is shortened so it is not the

9   entire product which we will go through later, so we

10   have moved forwards just a couple of minutes.

11   .

12   (Video played)

13   Do we see the bus stop on the left-hand side?

14   A.   Correct.

15   Q.   So this is Hayfield Road?

16   A.   Yes.

17   (Video played)

18   Q.   And at this point, if we can pause there for a moment,

19   7.13.36, we see a further tile in the middle which says

20   "Robson Kolberg's iPhone", and this is further footage,

21   all from 7.13.36?

22   A.   Correct. And in the corner we have the van driven by

23   Witness Grey as well.

24   Q.   Thank you.

25   (Video played)

   1   A.   Again, we have moved forward in time now and this is to

   2   the arrival of the first emergency service vehicles.

   3

   4   (Video played)

   5   Q.   We can see here it is 7.20. The emergency status

   6   buttons are here and we can see the red button for Paton

   7   has lit?

   8   A.   Correct. Paton's emergency button triggers at 7.20.42,

   9   I believe.

  10   Q.   Thank you.

  11   (Video played)

  12   And we can see the Airwave, the green button

  13   lighting up and we can see the reconstruction tile?

  14   A.   Yes.

  15   (Video played)

  16   Q.   If we stop it there, do we see on the right-hand side,

  17   sections of the Snapchat footage which was taken from

  18   Ashley Wyse's phone?

  19   A.   Yes, that's correct.

  20   Q.   And you have a larger tile and an enhanced tile within

  21   that?

  22   A.   Yes.

  23   Q.   Thank you.

  24   (Video played)

  25   And you have moved on again to 7.25.

 1   A. Correct.

 2   (Video played)

 3   Q. And now can we see movement towards the roundabout and

 4   we can also compare that to the reconstruction tile and

 5   see blue dots where that movement is being traced --

 6   indicative.

 7   A. Correct, but there are two people in that area so you

 8   can understand that there are two people roughly in that

 9   location.

10   Q. Thank you.

11   (Video played)

12   And again, we now see Snapchat footage, the final

13   Snapchat footage on the right-hand side?

14   A. Correct -- er, the second Snapchat footage.

15   Q. The second, sorry.

16   (Video played)

17   A. Just to explain as well, with the knife image, we were

18   able to analyse the meta image from that photograph and

19   it gave us the time at which that photograph was taken.

20   Again, that relates back to the real time clock, so we

21   know that at this point in time this is when that

22   photograph was captured.

23   Q. And again, we can see on the reconstruction tile a blue

24   dot --

25   A. Yes.

1   Q.   -- which signifies a person who has moved into that

2   area.

3   (Video played)

4   Again, 7.28, we see more Snapchat footage. This is

5   the final --

6   A.   That's the final we have in our presentation. I believe

7   Ashley did take some more photos later, but they were

8   significantly later and outside of the key area that we

9   were analysing.

10   Q.   Thank you.

11   (Video played)

12   And we have now moved on to 7.32 and this is coming

13   towards the end of this excerpt.

14   A.   Correct.

15   (Video played)

16   Q.   And can we perhaps stop there. What do we see on the

17   reconstruction tile?

18   A.   So we have represented the ambulance as effectively

19   a yellow block. We didn't have a make or model and it

20   just felt appropriate of us not to make those

21   assumptions, so we just used effectively a yellow block

22   of approximately the right size to show the movement of

23   that ambulance into the scene.

24   Q.   Thank you.

25   (Video played)

 1   I'm going to come back to the evidence video

 2   timeline in more detail later, but for the purposes of

 3   your slides that was a series of excerpts of the footage

 4   you have prepared shown as part of the slide show?

 5   A.   Yes.

 6   Q.   Thank you. I will come back to that. I would like to

 7   move on to slide 27, please. Tell us what we see here.

 8   A.   As I mentioned previously, the Snapchat footage is of

 9   a higher resolution than the Gallaghers pub footage.

10   This allows us to place people and vehicles

11   significantly more accurately than we can from the

12   Gallagher public house footage so what we're able to do

13   is we're able to take the original image which is on the

14   left-hand side, and we carry out a process where we try

15   to understand individuals within the scene and that's

16   that lower middle image. Just to bear in mind and

17   just -- that the image that we have actually analysed

18   here for the individual people is at a slightly earlier

19   time than the rest of the images and this is because we

20   felt that this was the best image of capturing and

21   understanding each person's position at that time.

22   But the position which we have analysed to

23   understand the locations of people is the slide you see

24   above it, and by carrying out that photogrammetric

25   technique, we're able then to be able to place people

1   back into the scene.

2   I think one thing that I need to clarify is we see

3   that there is a person in blue who appears to be near to

4   the ground and we can identify that person as an officer

5   because of his hi-vis jacket which you can see in this

6   footage, again, a slightly different time we will show

7   you that, but what we can't do is we identified there

8   are three legs at the bottom -- or towards the right of

9   that image. Because we can't understand or pick out

10   pixel differences or pixel colours between those three

11   legs what we can't do from an objective point of view is

12   exactly say whose legs belonged to the officers and

13   whose legs belonged to the other person.

14   It should also be noted that in this footage we do

15   not see the torso of Mr Bayoh, we do not see his head or

16   his arms, so there's very, very limited information to

17   be able to position and identify and say exactly what

18   was going on.

19   Q.   So you have limited what we see on the far right tile to

20   what you can observe from the information you have

21   available to you in the Snapchat footage?

22   A.   Yes.

23   Q.   So there are areas where you have not endeavoured to

24   reconstruct something because you weren't trying to put

25   your own interpretation on the scene?

 1   A.   Correct. We don't -- our job effectively stops when we

 2   can't see something and it's not for us to try and

 3   interpret that, we have to strip away all logic and just

 4   say what we're seeing in the scene.

 5   Q.   And you have done that. So where we see gaps, it's

 6   really a matter for the Chair --

 7   A.   Correct.

 8   Q.   -- to interpret that. Thank you.

 9   Now, would this be a good moment to then move on to

10   the enhanced Snapchat footage that you have prepared?

11   A.   So even though this footage -- so the Snapchat from the

12   first footage represents the highest quality footage

13   that we have of the restraint and we felt it was

14   important to make it as clear as possible as we can, so

15   we used a process called stabilisation. It is where we

16   take a point within the scene -- in this case it was

17   probably -- I think it was the wing mirror of the

18   vehicle and what we do is we track that position as best

19   we can as the video progresses through. We then get the

20   software to play that video back again but keeping that

21   pixel in the same place. We call that stabilisation and

22   it is used quite often in numberplate analysis and those

23   sort of techniques.

24   Q.   So this is a vehicle that's stopped?

25   A.   Correct.

1   Q.   It's in a fixed position in the scene.

2   A.   Yes. So this video is played at 100% speed but then we

3   now play it again at 25% speed.

4   (Video played)

5   Q.   And on the left-hand side we can see the full shot of

6   the original video and on the right-hand side you have

7   indicated it is stabilised footage with a 400% zoom?

8   A.   Correct.

9   Q.   So it is closer?

10   A.   Yes.

11   Q.   Thank you. And the speed has been reduced from 100% to

12   25%.

13   A.   Correct.

14   Q.   Thank you. Now can we move on to slide 28, please.

15   I think this is the third column of your work for the

16   Inquiry which is in blue, and can you take us through

17   this column of work.

18   A.   So this is where we start to assess the statements and

19   the aim here is to try to understand what information we

20   could take from all of the police and civilian

21   statements that effectively allowed us to create

22   a reconstruction, and we can break these down into four

23   areas. The first one I think I mentioned right at the

24   beginning is temporal and these are information related

25   by time or a timed event, such as, for example, an

1   emergency button being pressed.

2   The next is spatial and this relates to a location

3   or relative position of the events, of a person or an

4   object. For example, this could be when somebody is

5   talking about a road name as they are approaching the

6   scene to say which direction they're coming from, or it

7   could be an observation of a person or a vehicle within

8   the scene as well.

9   The next one is the person identification which

10   I think is fairly self-explanatory, but it is when

11   somebody identifies another officer within the scene or

12   a person within the scene, and lastly is object

13   identification, and for things like that we're talking

14   about location of a knife, or potentially a location of

15   a baton and these are described within the police and

16   the civilian reports.

17   Q. Thank you. Moving on to slide 30.

18   A. So in order to understand the statements that were given

19   to us what we needed to be able to do is be able to

20   place them against the real time clock. When somebody

21   writes out a statement it is normally written in

22   chronological order, but they don't have timings on

23   them, apart from maybe of very one specific time, which

24   is "I looked at my watch, I saw this time". Often it is

25   just a chronological run of events without any

1   differentiation between when these events occur. Quite

2   often they are not even spread out in terms of

3   spatially -- in terms of timing so it's not like you get

4   a comment every five minutes, you could get a very

5   detailed statement for five minutes and then there could

6   be a big gap between the next piece of relevant

7   information, so what we wanted to be able to do is

8   relate those statements back to the temporal information

9   which came from the objective evidence video timeline

10   that we created.

11   In order to do that we firstly -- so in order to do

12   that we created a spreadsheet. The spreadsheet

13   describes the audio and the visual information that you

14   see within that video and it describes it in comparison

15   to the real time clock. What we were able to do then is

16   go through the public statements and we're able to

17   relate the public statements to what we can see

18   physically in the scene so, for example, if somebody

19   describes their car, their colour, their make, we can

20   then relate that to the video and pick out the point at

21   which their vehicle enters and leaves the scene.

22   With the police statements, it was much clearer to

23   define and understand their evidence against the Airwave

24   events. Because they were obviously listening to the

25   Airwave at all times it meant that quite often they were

 1   all aware of what was being said on the Airwave and when

 2   it was being said and that allowed us a good way again

 3   to spatially locate the police statements against the

 4   real time clock.

 5 Q. And I will come back to this spreadsheet at the end.

 6   Can we move on to slide 31, please.

 7 A. So the first stage is pretty much what we covered in the

 8   last slide where we have taken all of those statements

 9   and we start to try to understand them in relation to

10   the temporal events.

11   Stage 2 is where we then start to identify within

12   those statements and within those events the areas which

13   can be reconstructed, again, by the parts we described,

14   which is the spatial, the person and the object

15   identification. That allows us then to understand which

16   areas can be reconstructed.

17   We then gave all that information to the Inquiry and

18   we asked for direction and what we wanted to understand

19   from them is which were the key areas of interest to the

20   Inquiry and which areas they felt there was agreement or

21   dispute between the various statements, and stage 4 --

22   I'm just going to move to the next slide because it

23   explains it a little bit clearer.

24 Q. Thank you. So this will be 32.

25 A. So what we have here is effectively a series of events

 1   following the real time clock, and we had many areas

 2   where there are agreement and that's not just agreement

 3   between police statements, but there that's also

 4   agreement between police and public statements.

 5   However, there are occasions where there would be

 6   disagreement, or dispute, where multiple versions

 7   wouldn't coincide with each other, and these were

 8   obviously sort of narrowed down and then reflected back

 9   to us as the ones that the Inquiry would like to

10   understand in more detail.

11   Q. Then slide 33.

12   A. I think it's important to say that when we talk about

13   a reconstruction we're not talking about a Pixar

14   animation, we're not talking about anything in that

15   level of detail. What we're looking at is a way of

16   helping and assisting the Inquiry. It is a tool to help

17   get the best evidence and achieve the best evidence with

18   the witnesses that you have coming here.

19   With that in mind, the first area that we have been

20   asked to help with is the alleged stomp, and what we

21   would like to provide there is the interactive 3D scene

22   as you have seen it demonstrated today. It would be

23   presented as you see it here, so we would have the

24   vehicles as they were at the time and that includes

25   the police vehicles. However, what we will not be doing

 1   before a witness gives their evidence is positioning

 2   people within the scene. We would hope that it would be

 3   allowed -- we would allow the witnesses to place

 4   themselves within the scene and use their own memory and

 5   judgment as to where they were. We can then replicate

 6   that once they have done that within this 3D view and

 7   understand where they believe their best positions of

 8   people -- of where they were and where people that they

 9   saw were, and we can actually look at that from any

10   point of view, so, for example, we can take it from

11   a window position or we can take it from a ground

12   position.

13   Q. And you're going to be able to assist the Inquiry with

14   placing people in the scene --

15   A. Correct.

16   Q. -- once the evidence has been led?

17   A. Yes.

18   Q. Thank you.

19   A. The second event that was highlighted as an area of

20   interest to us -- or of interest to the Inquiry --

21   please, I apologise -- is the restraint position. For

22   this we would not be using the 3D full interactive

23   reconstruction but instead we would be using a series of

24   stills. Those stills will allow a user to be able to

25   mark-up -- similar that you have seen me do on the map,

1   they will use the same technology and they will be able

2   to start to mark-up lines and circles as to where things

3   happened and they will be giving verbal description of

4   what happened in those areas.

5   So the type of stills that you will see would be,

6   for example, the two that you see here where there is

7   no -- there are no people placed within the scene.

8   We're also going to produce two images where we're going

9   to place Mr Bayoh in the scene based on the second

10   Snapchat footage where his torso and his legs are

11   visible and we will be placing his position based on

12   that Snapchat footage and that position, so again it's

13   an accurate objective assessment of his location.

14   The last images that we will provide are the ones

15   that we have been able to produce from the first

16   Snapchat footage which is the location of the officers

17   around the time of the first Snapchat footage.

18   The aim of this will again -- we will also provide

19   some of these slides which will have distances to allow

20   the Chair and the Inquiry to understand those distances

21   that are involved from different viewpoints.

22   Q.   So you have described how we will be able to use within

23   the hearings the interactive 3D scene in relation to the

24   alleged stomp, as you put it, but not to use that

25   interactive 3D scene in relation to the restraint other

 1   than in the use of stills.

 2   Can you explain to the Chair why the interactive 3D

 3   scene is not suitable for the restraint moment?

 4   A. The difference between the two is when we're looking at

 5   the stomp, we're looking at a very, very small period of

 6   time. It could be a fraction of a second, or a second

 7   at most.

 8   When we're looking at the restraint we're looking at

 9   it over a much longer period of time, we're looking at

10   it with many more people and significant different

11   angles. It's significantly more complex.

12   The reason we don't want to use the 3D view for that

13   analysis is because we think it will be simpler for

14   people to engage on that platform for more people.

15   However, when we're using the real time interactive

16   scenario for a single point in time, we feel that will

17   help people understand and place themselves better

18   because we can take their line of sight and we can ask

19   them to corroborate whether they're happy that that

20   represented their view and if not they can correct it,

21   so we can actually give a little bit more information,

22   a little bit of feedback to that specific point in time

23   as opposed to something that stretched over several

24   seconds or several minutes.

25   Q. Thank you. What I would like to do now is to move on to

1   look at the spreadsheet and the video timeline.

2   I understand that you would like a few moments just

3   to move from one technology to another and I wonder,

4   Chair, if that would be possible just for a few moments

5   to allow Mr DeGiovanni just to now change his system.

6   LORD BRACADALE: Very well. We will adjourn for about five

7   minutes or so.

8   MS GRAHAME: Thank you.

9   (3.01 pm)

10   (Short Break)

11   (3.13 pm)

12   LORD BRACADALE: Yes, Ms Grahame.

13   MS GRAHAME: Thank you. Before I turn to the spreadsheet,

14   Mr DeGiovanni, could we just go back again to explain

15   why we're not using the interactive 3D scene, other than

16   using stills, but why we're not using that for the

17   restraint? What would the difficulties be in trying to

18   use that interactive scene for the restraint?

19   A.   So as I've explained in the first part, one of the

20   issues is that obviously it happens over a longer period

21   of time and there could be multiple positions that

22   Mr Bayoh is in, in multiple orientations, but the other

23   issue is about the way people would describe themselves,

24   how they are positioning their arms, maybe how they're

25   holding Mr Bayoh and what position he is in, and what

 1   we're not able to do in real time is manipulate arms,

 2   legs, poses. We can't operate that quickly. What that

 3   would mean is if we were trying to do that kind of work

 4   in real time when somebody is giving their evidence, it

 5   would basically hold the Inquiry up, so we're trying to

 6   find the most efficient way in which the evidence can be

 7   taken, and then if there is enough evidence after that,

 8   potentially we could then reconstruct that back into

 9   a 3D scene in a slower time back in our offices, so it

10   isn't that we don't want to, it's just us being very

11   conscious of the people's time that you're bringing in

12   here and the time it would take to manipulate the scene

13   to the effect of showing that level of detail.

14   Q.   Thank you very much.

15   Could we turn now, please, to the spreadsheet.

16   I should say that there has been a copy provided for

17   you, Chair, and for both Assessors. There are also hard

18   copies provided on every seat for anyone who is in the

19   hearing room who wishes to follow the next passage of

20   evidence.

21   Could I ask, however, that those hard copies are

22   returned to the Inquiry team before people leave today.

23   In terms of the legal representatives of the core

24   participants, they not only have copies available, but

25   they have access on our digital system to the

 1   spreadsheet. Thank you.

 2   Let's look for now at the spreadsheet itself and as

 3   we go through this, Mr DeGiovanni, I would like to start

 4   playing parts of the enhanced video timeline, and what

 5   I understand is we're going to bring the enhanced video

 6   timeline onto the screen now, Ms Wildgoose, if we may,

 7   and if we could stop that there. We will see that, as

 8   we have seen earlier, the real time clock is again on

 9   the top left-hand side, the buttons for the calls and

10   the Airwaves are also just under there and we're

11   beginning with the dash cam footage from Harry Kolberg's

12   vehicle and I'm going to -- as we go through this

13   footage, if I may, I would like to break it down into

14   seven phases to try and make -- gather relevant parts

15   together.

16   So the first phase will be from the beginning of the

17   footage to 7.15.55, so we will play this through once

18   from 7.09.20 to 7.15.55. In this section we will

19   show -- we will hear the 999 calls that we heard

20   earlier, and can I also just -- before we begin can

21   I point out that this is the -- on the spreadsheet we

22   can see the times in the left-hand column, so this is

23   what you said in your slides earlier. The video timings

24   are in the first column and we're going to play from the

25   beginning down to 7.15.55 where people can see that on

 1   the spreadsheet. So it is on page 1 of the spreadsheet.

 2   We then see a column three in called "Caller ID

 3   Airwave transcription", and at the bottom of that page

 4   we can see some entries there, a call -- an Airwave

 5   sorry at 7.16.29, PC Ashley Tomlinson, and "Con 1" which

 6   is the control room Airwave?

 7   A.   Yes.

 8   Q.   And then the next column is "Event Airwave

 9   transcription", and do we see there a transcription of

10   what people are likely to hear on the Airwave -- on the

11   footage?

12   A.   That is correct.

13   Q.   And then in the next column along it's called

14   "Description of visible events in the video". Tell us

15   about this column?

16   A.   So over here what you have is the -- it's basically

17   a benign description of what we can see in the video

18   footage available to us. We have tried to remove as

19   much interpretation as possible, so it is a minimal

20   amount of subjective interpretation of what we're seeing

21   and it is mainly to try and relate events that we can

22   see in the video specifically to the timeline and that's

23   the reason we generated this in the first place.

24   I should also note that there are several entries in

25   here that haven't just been created by ALI, but they

1   have been created by the Inquiry team as well, and it is

2   effectively a combined effort to produce this

3   spreadsheet to be the most faithful version of --

4   written version of the events that we see in the video.

5   Q.   Thank you. And again, in terms of cross-checking

6   things, if we look at the first entry in the

7   spreadsheet, which is at 7.09.20 to 7.09.33, we see the

8   description of visible events and it talks about

9   a figure seen walking and then in the final column it

10   gives a reference number and it refers to dash cam

11   footage. What's in the final column?

12   A.   So when we're making observations within the evidence

13   video timeline there could be multiple tiles or multiple

14   videos open at any specific time, so what we want to be

15   clear about is when an observation is being made as to

16   which tile that observation is being made in, so, for

17   example, if something is being seen in the Gallagher pub

18   footage, then everybody knows that that is where we are

19   making that observation from.

20   Q.   So the first three entries in the spreadsheet, so under

21   the description of visible events, those first three

22   entries are a description of what can be seen in the

23   dash cam footage and the footage from Robson Kolberg's

24   iPhone?

25   A.   That is correct.

        1   Q.   So as we're watching this footage in real time, if

        2   people want to focus on areas that we see described in

        3   the spreadsheet, for the first three they should be

        4   looking at the dash cam footage, the mobile phone

        5   footage and then further down we see that their focus

        6   should be on Gallaghers' CCTV footage?

        7   A.   Yes, that's correct.

        8   Q.   And that's from 7.15.25, and it talks about a person in

        9   a light top and dark bottoms visibly walking towards

       10   Gallaghers pub?

       11   A.   Yes.

       12   Q.   And those entries are from CCTV?

       13   A.   Yes.

       14   Q.   So the phase 1, which you're about to show, look at

       15   first of all the dash cam and the mobile phone and then

       16   the Gallaghers' CCTV, if people wish to do so.

       17   A.   Correct.

       18   Q.   Thank you. Right, let's play stage 1 please.

       19   (Video played)

       20   And as we approach 7.15.25 which we see on the

       21   spreadsheet, we will be coming up to another sighting

       22   and this should be from the CCTV?

       23   A.   The Gallaghers pub CCTV.

       24   Q.   The Gallaghers pub CCTV. So again, if people can focus

       25   their attention on that area.

 1   (Video played)

 2   And this is combined with the reconstruction tile

 3   showing the location of the person moving?

 4   A.   Yes.

 5   (Video played)

 6   Q.   And before we leave this first phase, could I ask you,

 7   Ms Wildgoose, to go back to 7.13.15. Mr DeGiovanni, you

 8   mentioned earlier when we went through the slide show

 9   that you had, as part of the process of the work you

10   completed, you had cross-checked things with

11   Harry Kolberg's car?

12   A.   Correct.

13   Q.   Are we able to see that in this footage?

14   A.   Yes, so if you look at the Gallaghers pub CCTV, just

15   below the R of Gallagher, if you follow that down onto

16   Hendry Road you can just make out some red dots and

17   that's --

18   Q.   Is that Hayfield Road?

19   A.   Hayfield Road.

20   Q.   That's fine.

21   A.   And that's the brake lights of the vehicle that we see

22   in the dash cam footage.

23   Q.   And that's what you referred to earlier in your slides?

24   A.   Correct.

25   Q.   Thank you. I would like to move on to the second phase,

 1   please, and this will run from 7.16.22 to 7.20.12. So

 2   7.16.22 which you will see the timing of audio timings

 3   in the spreadsheet on page 1, to 7.20.12, which is on

 4   page 3 of the spreadsheet. As we go through this, we

 5   will hear a number of Airwaves messages from the area

 6   control room and we will also see -- if we look on

 7   page 1 of the spreadsheet you will see a reference at

 8   7.16.28 to a -- CCTV -- on the CCTV from Gallaghers pub,

 9   person who has walked up Hayfield Road but is still

10   visible on the CCTV. Thank you.

11   (Video played)

12   Q.   If we can stop it there. I would like to move on to

13   phase 3, and this will begin at 7.20.13 and you have

14   just stopped the second before that and it will carry on

15   to 7.21.38, so that's 7.20.13 to 7.21.38. This will

16   cover the period of time from -- you will see on the

17   spreadsheet at 7.20.13, there is an Airwaves call from

18   Inspector Stewart in the area control room which is

19   transcribed in the middle column of the spreadsheet and

20   the description comes from Gallaghers' CCTV. And as we

21   look at this screen we will see events from Gallaghers'

22   CCTV which will be also reconstructed in the tile at the

23   top of this screen in the middle and we will see that

24   the first entry in the spreadsheet says:

25   "Large marked police vehicle arrives from the south

1   turning into Hayfield Road."

2   And then two lines down:

3   "Police van stops on Hayfield Road within field of

4   vision and shown on the CCTV."

5   And that moment -- the vehicle stops, first vehicle,

6   at 7.20.23. And this phase, this third phase of footage

7   will end at 7.21.38, which we can also identify on the

8   spreadsheet, which is on page 5 of the spreadsheet and

9   you will see the first entry where we're going to end

10   this footage indicates "Male secure on the ground".

11   Again, during this we can see other vehicles

12   described as arriving on the spreadsheet at 7.20.30 and

13   that second vehicle stopping at 7.20.39 on the

14   spreadsheet, and then there is an emergency status

15   button turned on at 7.20.42. Then from 7.20.52 we see

16   a series of events depicted in the CCTV and there

17   appears during this period of time two visible falls, so

18   people have fallen or landed on the ground.

19   A further emergency button on at 7.21.19, and then

20   some other movement which I will come back to at 7.21.21

21   of an observer and, as I said, 7.21.30 at the top of

22   page 5 of the spreadsheet is an Airwaves message from

23   PC Smith indicating "Male secure on the ground", so this

24   will be the third phase of the footage and I would like

25   you to play that now.

 1   (Video played)

 2   Thank you so. That's the complete phase 3. I would

 3   like you to go back, if you may, to 7.21.21, so we have

 4   seen the CCTV footage, the reconstruction and I would

 5   now like to go back to 7.21.21. If we rely on the

 6   description on the spreadsheet, you will see that there

 7   is an Airwaves message from Ashley Tomlinson at that

 8   time, but in addition it indicates "movement of a

 9   possible person can be observed from the residential

10   properties on Hayfield Road", and I would like to go

11   back and look at this in case anyone missed it when they

12   were looking at the CCTV.

13   Can you point out, Mr DeGiovanni, where people

14   should look if they wish to see this part that's

15   described in the spreadsheet, so this is at 7.21.21,

16   which is the real time we have on the screen at the

17   moment.

18   A.   So if you look at this area here, so what you're going

19   to see is what appears to be the top half of a person

20   moving from their house across to the street.

21   You will also be able to see it in the

22   reconstruction as a blue cylinder walking along that

23   path.

24   Q.   Thank you. Now, I would like to show this part of the

25   footage again, and if possible, could we remove those

1   red circles so that people can see the full image.

2   Thank you. Perfect.

3   (Video played)

4   And do we see that -- sorry, I will ask you to pause

5   it there -- the blue circle disappears in the

6   reconstruction tile when the moving image disappears

7   behind a tree on the CCTV image?

8   A. That is correct. It is no longer observable.

9   Q. Thank you. Thank you very much.

10   We will move on to phase 4, please, and this will

11   run from 7.21.38 to 7.25.17. So 7.21.38 which is on

12   page 5 of the spreadsheet, to 7.25.17, which you will

13   see on page 7 of the spreadsheet. So we're moving

14   between pages 5 and 7, and you will see that on page 7

15   we're ending at 7.25.17 where an Airwaves call is

16   transcribed from PC Smith indicating:

17   "The male appears unconscious, breathing, not

18   responsive, get an ambulance for him."

19   So phase 4 covers the period up to the point that

20   a request is made for an ambulance and can I also ask

21   you to look at the spreadsheet on page 5 at 7.22.18,

22   next to a description of what we can see in this

23   Snapchat footage which says:

24   "A person in a grey T-shirt can be seen standing in

25   the front garden near the entrance of one of the

1   residential properties on Hayfield Road."

2   So as we look through the footage, at 7.22.18, we

3   will see the Snapchat coming onto the screen and we

4   should see a person in a grey T-shirt. Thank you.

5   (Video played)

6   So that actually finishes at 7.25.24, we see on the

7   screen.

8   Could I ask you briefly to go back, in case anybody

9   missed it, to the -- sorry, it is on page 5 of the

10   spreadsheet, 7.22.18, page 5 of the spreadsheet, 7.22.18

11   and again, Mr DeGiovanni, would you be able to circle in

12   red where we see this area that's described in the

13   spreadsheet: a person in a grey T-shirt to be seen

14   standing in the front garden near the entrance of the

15   residential property.

16   A.   So just here you can see a grey top and dark trousers.

17   I think as the camera will pan around you will see

18   a little bit more of him, but that's the location of

19   where we can see that person.

20   Q.   Thank you. Could we remove that red circle while we

21   watch this Snapchat footage now, please. Thank you. So

22   that's the person that's described in the spreadsheet.

23   A.   Correct.

24   Q.   Thank you. I would like to move on to the fifth phase

25   which is between 7.25.25, which is on page 7 of the

 1   spreadsheet and 7.34.08 which is when the ambulance

 2   arrives. This ends on page 13 of the spreadsheet,

 3   7.34.08, by which time the ambulance has arrived. There

 4   are only two things that I would like to point out on

 5   the spreadsheet during this, the fifth phase.

 6   7.27.54, a light-coloured vehicle approaches and

 7   a person near the grassy area stops, approaching

 8   Hayfield Road and pauses and I would like -- there's

 9   a reference here to Gallaghers' CCTV but we will see the

10   reconstruction tile indicating where this person is.

11   I wonder if we could move to 7.27.54 rather than

12   playing this entire section, would that be possible?

13   I'm conscious of the time. So at the bottom of the page

14   we have the CCTV footage and at the top we have the

15   reconstruction and we can see a blue dot?

16   A.   Yes.

17   (Video played)

18   Q.   And if we could pause there for a moment just to draw to

19   people's attention, there's a person on the CCTV footage

20   standing at the roundabout. Could you highlight that

21   for us, please?

22   A.   The upper end of it --

23   Q.   The CCTV, if possible.

24   A.   Are you talking about the one on the roundabout?

25   Q.   The one on the roundabout, first of all. And show us

1   the blue dot on the reconstruction where that's

2   recreated, and then show us the other person -- you may

3   need to move that red circle slightly on the

4   reconstruction.

5   A.   On the reconstruction there -- there we go. Hopefully

6   that makes sense.

7   Q.   Yes. So two people visible on the CCTV and they are

8   indicated by blue dots on the reconstruction tile.

9   A.   Yes.

10   Q.   Thank you. Could we perhaps fast-forward to 7.33.35.

11   We're still within phase 5, but I'm taking this short.

12   So 7.33.35, on page 13 of the spreadsheet, it's the

13   second row and the description given from Gallaghers'

14   CCTV is of the ambulance arriving during phase 5 and we

15   will also see this as you demonstrated earlier, the

16   yellow tile -- the yellow --

17   A.   Block.

18   Q.   -- block, thank you. The yellow block on the

19   reconstruction tile. Let's watch that, please.

20   (Video played)

21   Thank you. Can we pause it there, please, and

22   that's the yellow block on the reconstruction, we can

23   all see that.

24   A.   Correct.

25   Q.   And at the bottom we saw a vehicle arriving on the CCTV.

 1   A. Yes.

 2   Q. Thank you. Then if we could play just the next few

 3   seconds, we will hear an Airwave that's transcribed on

 4   page 13 of the spreadsheet which should say "Ambulance

 5   at locus".

 6   (Video played)

 7   Thank you very much.

 8   Then we're moving on to the sixth phase which begins

 9   on page 13 of the spreadsheet. This is from 7.34.08 to

10   7.38.13. The sixth phase ends -- it begins on page 13

11   and ends on -- sorry, 7.34.08 to 7.38.13, and 7.38.13 is

12   on page 14.

13   A. 14.

14   Q. Thank you. 7.38, 14, and that ends with an Airwave

15   message which we will hear saying "Male on stretcher",

16   he is being taken to the hospital. So that's page 14 at

17   7.37.56, which is an Airwaves message from

18   Samantha Davidson that's transcribed and it says "Male

19   on stretcher, remains in cardiac arrest", and then it

20   mentions the ambulance. Could we listen to that,

21   please? Thank you.

22   (Video played)

23   Perhaps we could fast-forward, actually,

24   Ms Wildgoose, to 7.37.56, which is the Samantha Davidson

25   Airwaves.

1   (Video played)

2   Thank you. That's the end of phase 6, and then

3   phase 7, from 7.38.16, which is on page 14 of the

4   spreadsheet, to the end of the spreadsheet and we see at

5   7.43.36, the end of the spreadsheet and the

6   transcription, by which time the second ambulance has

7   been cancelled, and we see that transcribed in that

8   seventh phase.

9   I don't intend to invite you to play that. Thank

10   you very much, Ms Wildgoose.

11   Thank you very much, Mr DeGiovanni. That's the

12   entire footage and the spreadsheet which can be used to

13   interpret that footage --

14   A.   That's correct.

15   Q.   -- if people wish to do so. Is there anything else that

16   I have not covered today that you feel we should discuss

17   now?

18   A.   I think it's just to state that when we initially -- if

19   you remember the original plan, this was never designed

20   to be an end product. What happened was as we presented

21   to the Inquiry as part of our work, they realised the

22   value of it and they felt the value to all of you people

23   watching would be significant and that's -- from that

24   point on we developed it into what it was, or what it

25   is, and this became really a joint product between us

 1   and the Inquiry and, as I said previously, and it is

 2   just our interpretation of what we have seen, but we

 3   have tried to keep it as faithful to what we can see in

 4   the CCTV and the video as we can.

 5   MS GRAHAME: Thank you very much.

 6   LORD BRACADALE: Thank you, Ms Grahame.

 7   I am now addressing the legal representatives. No

 8   written applications under Rule 9 were submitted in

 9   respect of this witness.

10   The witness will be returning and he has indicated

11   that he is preparing a report, so it may be that in the

12   future, legal representatives may wish to make

13   suggestions as to lines of questioning or make Rule 9

14   applications. Against that background, does anybody

15   wish to make an application at this stage? No, that's

16   very helpful, thank you.

17   Well, thank you very much, Mr DeGiovanni, that's

18   been very helpful to the Inquiry and we look forward to

19   seeing you again in due course.

20   The Inquiry will now adjourn until tomorrow at

21   10.00 am.

22   (4.00 pm)

23   (The Inquiry adjourned until 10.00 am on

24   Friday, 13 May 2022)

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