

have. Thank you.

170. MS WHARF: Could we move to the next slide then just to summarise what we have learnt and what we would say are the residual impacts? Because Mr Mould has been telling us it's a matter of balance and that HS2 Ltd has got it right. And we would say 'well, have they actually got it right?' We've got the AONB we've heard about; we've heard about the ancient woodlands, and these are things that are still going to suffer at the end; we've got a portal and we all know where that is, right in the middle of a very beautiful spot; we've got property blight that you've heard about; we've got noise that we're going to come on to a little bit more where there's no guarantees; we've got the community impacts; and we've got all the construction disruption. So we would say there's still plenty of issues to mitigate, and obviously what we're seeking is a mitigation with a bore tunnel.

171. So could we move to noise? Just about everyone in the community is anxious about noise. And I'm afraid I have to say that nobody trusts the HS2 Ltd's assurances and reassurances about noise. And what particularly concerns us is the peak noise and particularly at night time. And I'm not coming at this as an expert; it's simply about will people hear the noise and be annoyed by it? And what we've taken as a lead on this is Mr Mould raised the issue of whether peak noise really would be obtrusive. And he set up some useful tests which he applied to Wendover. And we've reapplied those tests to South Heath.

172. So, first, let's take this example of the green tunnel that we're told is going to protect us. So could we move to the next slide? Now, I think you've seen a similar map to this to Wendover. And basically you've got the noise as it is set out by HS2 Ltd with all those colours in the middle. I think you can see the green tunnel with the little green bars in the centre, slightly to the right just below South Heath. And then you've got what we drew on from HS2 Ltd's own data: the 60 dB max contour. And I'm sure you all know about the 60 level which is the World Health Organisation level, above which at night time there are adverse health effects. And it's also the level at which there is no quiet enjoyment of outside spaces.

173. So the first point I would make about that is that if you look at the amount of green tunnel that lies inside – or outside perhaps, just the little bit in the middle – that's

the bit that is protected from certainly just that one contour, the 60 dB max, so the sort of the 'whoosh' of the train as it goes by. And I'd like to quote from a petitioner who came from the HS1 Committee on 14 February 1996. He was a Professor Robert Bottle from the Harrietsham Parish Council, and they were very much affected. And he too was coming representing petitioners saying 'well, will our sleep be affected?'. And he said peak noise, or LAmax as it's called, should be a very important criterion and not just the average level. 'Chairman,' he said, 'if one night I was to creep into your bedroom twice and fire a shotgun into the ceiling this average noise, this LAeq, would not be materially worse; but may I suggest that your sleep would be materially worse.' And I think this encapsulates how people see it as a resident, not as an expert saying 'well, the experts say it's not like that'.

174. CHAIR: It is also true when I talk to colleagues who have the HS1 running through their constituency and I say, 'Do you get lots of complaints?' and they say, 'No, it's not mentioned.'

175. MS WHARF: Well, I'd like to then look at the data that we've now been given. And the difference perhaps because we took the data that Mr Mould expressed to Wendover. Because if we can go on to the next slide, we have at Exhibit 1252 an analysis that we did in exactly the same way, we believe, as it was done by Mr Mould for Wendover where what he argued was that the peak noise, the HS2 dB max level, if you compared it with the background noise levels that you were given then actually it lies in the range between the average and the peak in the background noise. Well we took that data and we applied it to South Heath, and the details of the results are in the exhibit.

176. SIR PETER BOTTOMLEY: This is operational rather than construction, is it?

177. MS WHARF: This is operational; only looking at operational. And this is with a green tunnel. This is after we've been told it's been mitigated. So we take Potter Row. Now, Potter Row is mostly outside the green tunnel. We see 37 properties – that's every property in Potter Row – above 60 dB max. And we say, 'well, how much higher is that than the data we're given for what the background noise level is?'. Well, everyone but four homes is 20 decibels high. So, as we know, that's four times louder. But there's a range because there's an average and there's a peak; there's a car that goes through at

night too so there'll be peaks at night. But also when you look at that, all but four properties, they are 15 to 20 decibels; that's twice to four times louder than even the peak. So I would say that it's impossible to say that you're not going to hear the 'whoosh' of HS2, the max level, at Potter Row at night.

178. But they then come to South Heath and we're told in South Heath we're protected. But actually 97 properties, so that's about a third of the properties, they also lie outside the 60 dB max. And it's almost the same answer. So they too are above the average background noise level and also over half of them above the peak. And at Hyde End it will reach great extremes because, as we heard from Sue, they've got properties right on the line. But the upshot of this is in these three communities that we're talking about we've got 167 properties which are going to be hearing this 'whoosh' of HS2 and 80% of them are above the average background level. So whether the people in Kent were in a different circumstance I don't know but this is our data that we've been given as part of the ES and we've simply looked at that same data and we would say it is unlike the position that Mr Mould was putting for Wendover: for South Heath it is different and I'm quite sure exactly the same exercise could be done to look precisely when you look at individual homes whether actually that's true for all the individual homes in Wendover.

179. MR MOULD QC (DfT): Might I just correct one point lest this begins to gather force on a false basis? I did not compare the existing background noise level in Wendover with the predicted peak noise from the operation of the train. I compared the existing peak noise level in Wendover with the predicted peak noise levels of the train. There is a fundamental difference: I was comparing like with like or apples with apples; this is comparing apples with pomegranates.

180. CHAIR: Alright. Carry on, Mrs Wharf.

181. MS WHARF: The understanding from Wendover was that this was the comparison that had been done: it was the two peaks. It was the car in the night compared with what it was going to be like if HS2 came in the night. And I would actually say something on frequency too because the frequency of HS2 for people who are trying to go to bed, for children and for elderly, is much more than the odd peak in the night because it's going to be regular and they go up to very late at night. So the

whole frequency issue we haven't even built into this. So our conclusion is HS2 is going to be detrimental.

182. Perhaps if I could move to the next topic, health and wellbeing, where Malcolm is going to take over.

183. MR GRIFFITHS: The reason that Hilary has asked me to address this issue is because for six years I was a non-executive director of Buckinghamshire Healthcare Trust that runs all the local hospitals except for Mandeville, Wycombe, Amersham and also the local community care programme. I was also for three years chair of the Patient Safety Federation for the south central area. So I know a little bit. But let me tell you something: I'm not clinical, I'm not medical. I can actually add nothing to what has already been said about the anxiety and the stress and the conditions and the concerns of the ambulances getting there that has already been expressed. And in fact I would say it's not organisations that don't really understand the individuals' position to be making judgements on this. So I'm going to say nothing more on this slide. We would like to see HS2 Ltd taking the issue a bit more seriously but I'm going to say nothing more because you've heard the message.

184. CHAIR: It has come up before and it was in our interim report about the line: the stress and people worrying about the project and their mental health and all the other issues.

185. MR GRIFFITHS: Yeah, it's pretty obvious.

186. CHAIR: We did muse whether somebody at some point ought to take up some research on it.

187. MR GRIFFITHS: Some time back I actually made enquiries into that. The difficulty is that the sample size is not really going to be sufficient to get statistically sound evidence out of it.

188. Okay, moving to the next slide. Now, I feel I can say a little more about this. I'm from the oil industry, that's my background. I was with Conoco / DuPont who at the time were world leaders in safety, and as an operations manager it's instilled into you that you look for every opportunity to improve the safety situation. In fact, at the time

of the Piper Alpha disaster, I had the privilege of running the safest operation in the UK – nothing to do with me, I just inherited it – and I was asked to basically work on the industry response as to how the regulatory regime going forward could address a lot of the issues that were in the oil industry at that time. So I feel a little more comfortable on the safety issue.

189. The reason we've got this here, back to your aide memoir, is that HS2 have said that in the operating condition the tunnel worsens the safety situation; and we do not agree with that. The reason they've done that, I think, is because their paradigm is coming from their own staff and their own operation, so they've looked at the maintenance activity but they haven't looked at the impact on residents and passengers. And I'd like to talk about two things in particular. One is a difficult subject but the railways unfortunately are prime choice for people that want to commit suicide, and any access opportunity is a risk therefore. And basically by having the tunnel we get rid of a large number of bridges and portals which, if you look at the pictures down at the bottom, the two in the middle, these are the two suicides that have occurred on HS1 in the last six months; one of them accessed from an underbridge and one of them from a portal. So actually reducing that access is a key thing. It's only 4.1 kilometres but it has to be better if it's restricted by a tunnel.

190. MR BELLINGHAM: Can I just ask, is there any evidence that people wanting to commit suicide will do so anywhere? So, in other words, if they've taken that tragic decision then they'll go to another part of the track or is there evidence that some people maybe have an aberration or whatever and will opportunistically take their life and therefore having the temptation of something going here is a factor? How would you look at it?

191. MR GRIFFITHS: I know that we cannot be definitive, and the reason I know that is that the Patient Safety Federation that I was chairing was asked to fund such a study and unfortunately we didn't have the money to do it. But suicide is not pre-determined. You know, the Samaritans and the work that they're doing with Network Rail is about things like this, reducing the access, but also the whole Samaritan activity is if you can get people into a conversation and get them past that point then, no, they're not going to find somewhere to jump off a bridge or something. So there isn't definitive evidence but access is a part of it. If the access isn't immediately available then people could well

get past the feeling.

192. SIR PETER BOTTOMLEY: The sensible assumption is that access and opportunity make a difference, not complete difference.

193. MR GRIFFITHS: Exactly, yes.

194. CHAIR: Okay. Let's continue.

195. MR GRIFFITHS: Okay. The other thing that I'd like to mention is that with the tunnel there is more slab track than ballast track, and HS2 Ltd might want to contest this later on, but I think there's pretty clear evidence that slab track on a railway system like this is going to be safer.

196. SIR PETER BOTTOMLEY: In terms of maintenance risk?

197. MR GRIFFITHS: No, in terms of risk of derailment basically.

198. MR HENDRICK: Is that because it's likely to buckle?

199. MR GRIFFITHS: It's interesting because I just received some information from HS2 Ltd, from an FOI that I put in place. I mean, the Chinese high speed rail system was due to go 350. In 2011 they restricted it to 300 km/h because of safety concerns. They haven't raised it again. They're doing an awful lot of research on the dynamics associated with going above 300 because the whole thing is not understood – there's a lot of research going on – and they haven't yet found a solution to it. But I think that it is a rail fatigue issue, that basically because the dynamic loads are so much higher because you get more resonant frequencies then, you know, you've got rail breaking.

200. SIR PETER BOTTOMLEY: I think it's a fascinating issue but I think it's not one that's going to be influencing this decision.

201. MR GRIFFITHS: It absolutely isn't and I apologise. It's just that we see it as being a higher safety risk. We'll move on.

202. SIR PETER BOTTOMLEY: I see what you mean: kitchen sink.

203. MR GRIFFITHS: Fair enough. Okay, we're now going to come to the section in your aide memoir on programmes. So we've covered some of the stuff in the middle

and we're now going onto the programme issues. And as we've worked with HS2 Ltd we sort of feel that there's quite a bit of conservatism in the estimates. And I'll only mention the one at the bottom. With respect to this, it runs the risk of biasing design choice or, put more bluntly, we can't have a tunnel because there's conservatism in the schedule.

204. So if we move on. Now, this is quite a complex slide and it's going to take me a few minutes to go through it. Now, this is the issue really as to whether the REPA tunnel will delay the schedule. And Hilary has already mentioned that if you come outfitting from both sides we are agreed that it won't. We believe it can be done from one end and there is this issue of cost and disruption of doing the outfitting. So you could say this is a relatively minor issue for the amount of time I'm now going to spend on this, and personally I am disappointed that we weren't able to resolve it but we weren't so we're here.

205. Column A is the schedule that HS2 Ltd have put forward for the Chiltern Tunnel as is. I'm not going to go through all the details but it gets to 8.25 years. They have, for a number of the tunnelling activities, given us the rates but their schedule would suggest that they are done in sequence. We believe that a number of those things can be done in parallel and we have an expert witness coming up shortly that's going to explain how that is. And so B is taking what they've said but adding the ability to do it in parallel. And you will see that creates a gap in the middle; a time when nothing's happening. And interestingly enough in the Draft Environmental Statement that's what was presented from HS2 Ltd.

206. C is the impact based on their base assumptions of going the extra 4.1 kilometres, so everything gets longer. D is if you do outfitting from both ends, then you can get it back within the timescale.

207. SIR PETER BOTTOMLEY: And those four are HS2 schedules?

208. MR GRIFFITHS: They're all HS2.

209. SIR PETER BOTTOMLEY: Alright. And they're assuming that any change to this Bill doesn't delay a start date?

210. MR GRIFFITHS: Correct.

211. MR STRACHAN QC (DfT): Just to be clear, B is not our schedule.

212. MR GRIFFITHS: No, sorry, you're absolutely right. You're absolutely right.

213. SIR PETER BOTTOMLEY: A, C and D.

214. MR GRIFFITHS: Yes. B is REPA's view of HS2. I do apologise. Now, in order to be able to do the longer tunnel within the time scale, E shows what would be required, and it isn't very much in terms of improvement in boring rates and it is having a parallel sequence on the outfitting. If you like, it's a reasonable place for us to have reached agreement on before we came here but it didn't happen.

215. The last two are REPA cases, one based on boring at 120 metres a week and the second one is what we call our central case which is doing everything, the boring and the outfitting, based on as our experts say it should be possible to do. So obviously both of those meet what is required but they're sort of not unnecessary because –

216. SIR PETER BOTTOMLEY: Is G 120 metres a week plus other changes?

217. MR GRIFFITHS: It's doing the outfitting a lot quicker.

218. SIR PETER BOTTOMLEY: But it's still assuming 120 metres a week?

219. MR GRIFFITHS: It's still assuming 120. So those are the cases that we're talking about. We're now going to call our first technical expert witness. And this information is going to get quite technical and we'll see how we get on. Sean?

220. MR CLIFTON-BROWN: Can I ask, Mr Griffiths, while you're changing over: we've heard earlier evidence that the normal tunnel boring rate is 80. Why do you think it can be done so much quicker?

221. MR GRIFFITHS: We will be coming to that with our expert in quite a bit of detail. All I would say is I don't think the normal rate is 80. I think 80 is the rate that HS2 Ltd have used as their –

222. MR CLIFTON-BROWN: What was the rate of HS1?



223. MR GRIFFITHS: The rate for HS1, we will be coming to that.
224. MR CLIFTON-BROWN: That was the evidence we heard: HS1 was about 80.
225. MR MOULD QC (DfT): Mr Smart is going to be dealing with this later.
226. MR GRIFFITHS: I think we'll both be dealing with it later with our experts.
227. SIR PETER BOTTOMLEY: If you could give us one number as an approximate number I wouldn't mind having it.
228. MR MOULD QC (DfT): 80 for a slurry machine in chalk is a crude average.
229. MR GRIFFITHS: I think there are only three tunnels that have been that slow, and I can go into them now or I can go into them later.
230. SIR PETER BOTTOMLEY: Maybe when the witness is doing it. We're not going to come to an absolute conclusion; what we're going to hear is that there's a range and it's sensible if you're planning a big project to start at the bottom end of the range, and if you're trying to argue for something slightly differently, to say 'we might do it much better'. When I was building roads we often got them completed a year early because things went better than we expected and we planned for them not going better.
231. MR GRIFFITHS: Yeah, I think we take that onboard.
232. SIR PETER BOTTOMLEY: The sort of approach you're used to in the oil industry, I guess.
233. MR GRIFFITHS: Well, let me fast-forward and talk a little bit about my experience on projects. I was the general overall project manager for the Britannia field during the planning stage. The Britannia field was a £2 billion gas project that was the UK's biggest one. And basically during that planning period we took the £2 billion down to £1 billion and we took the schedule quite considerably and we set aggressive targets for everyone and we set up the environment and the contract structure to allow them to beat them. Now, nothing to do with me because I left – I'm not so good with the execution side of things – but basically the project did deliver and the National Audit Office have used that project as the key case study in their value for money work for the Ministry of Defence. So from where I come from, no, you put in realistic assumptions;

you then get a whole bunch of people to try to find out how they can beat them; and you tie it up quite tight and you run forward. Clearly if you have a risk you have to work out how you're going to deal with that risk if something overruns. And I think that is the point. I understand where HS2 Ltd are coming from in saying 'maybe we need to be a bit conservative'. Personally I would rather see it much more transparent so that you can actually see how you address it. I need to move on.

234. CHAIR: Alright. An hour-and-a-half ago there was some quite extravagant things made about saving money and it not costing the taxpayer anything to do the project. Are we about to get to the point of you explaining how you can do that?

235. MR GRIFFITHS: Yes. So Sean Ring is our expert on this area. I'm not going to ask Sean Ring to go through all of his CV other than to say that I notice that there are a couple of times that very recently he's been working for CH2M Hill so he could just as easily be here as the expert witness for HS2. He is an absolute expert in this field. Sean, are you able to hear?

236. MR RING: I'm struggling to hear, I'm afraid. I have a severe tinnitus problem that is at its worst.

237. SIR PETER BOTTOMLEY: Do both ears work the same or should you change places?

238. MR RING: No, he's on the best side.

239. MR GRIFFITHS: Okay, well we'll see how we go. We have asked Sean to give his answers in writing as well so I know more or less what he's going to say, and if it gets difficult we can have it here. So, Sean, how familiar are you with the fit-out scheme for rail systems and tunnels from Ruislip?

240. MR RING: Well, I've been working with Peter Brett Associates on both the London Borough of Hillingdon petition and also for the Chiltern long tunnel so I've looked at the schedules and I am aware of the proposals to fit out from Victoria Road box and from West Ruislip. And that also involves work on looking at Heathrow Spur. But, more importantly, I've been very aware of changes in the approach and schedules that have come out in correspondence and in the latest schedule in HS2's pack of