

## MINUTES OF ORAL EVIDENCE

taken before the

### **HIGH SPEED RAIL (CREWE - MANCHESTER) BILL SELECT COMMITTEE**

#### PETITIONS AGAINST THE BILL

Monday, 19 June 2023 (Afternoon)

In Committee Room 8

A video of the proceedings can be found [here](#).

#### PRESENT:

Andrew Percy (Chair)  
Antony Higginbotham  
Grahame Morris  
Martin Vickers

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#### FOR THE PROMOTER:

Timothy Mould KC, Lead Counsel, Department for Transport

Exhibits referred to by the promoter during the hearing with Manchester City Council, Greater Manchester Combined Authority and Transport for Greater Manchester can be found [here](#).

#### FOR THE PETITIONERS:

1. Manchester City Council
2. Greater Manchester Combined Authority
3. Transport for Greater Manchester
  - Neil Cameron KC
  - Andrew Byass
  - Adam Palmer
  - David Hindle
  - Adrian Lonsdale
  - Dr David Simmonds

Exhibits referred to by the petitioners during the hearing can be found [here](#) (part 1) and [here](#) (part 2).

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#### **IN PUBLIC SESSION**

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(At 4.15 p.m.)

1. CHAIR: Good afternoon, everyone. Welcome to this afternoon's meeting of the High Speed Rail Hybrid Bill Select Committee. Before we start, I just want to recognise that we've got a special guest with us today. I know we're not meant to do this but we've got Volodymyr Kreydenko who is a Ukrainian Member of Parliament and deputy chairman of the transport and infrastructure committee. So he's come to learn either how to do infrastructure or how not to do infrastructure but we're very pleased to have you with us today. So thank you for joining us.

2. Today the Committee will hear the remainder of the Manchester Authorities and the Manchester Partners' case on the issue of the location of the new high speed station at Manchester Piccadilly. We are obviously aware, as I've said at previous meetings, about the significance of this issue and have therefore decided to sit for an extra hour in our meetings today and tomorrow and to sit additionally tomorrow morning from 9.00 a.m., and that should enable the petitioners to conclude their representations before the promoter responds.

3. We're also going to hear tomorrow from Lucy Powell MP who, of course, is the Member of Parliament for Manchester Central where Manchester Piccadilly is located. If there is time, both parties will have the opportunity to present closing arguments at the end of tomorrow's sitting. I'll now hand over to the petitioners to continue presenting their case and, as usual, I encourage the petitioners' representative to consider how they wish to allocate and use their time today to ensure we get to hear your case in full, and all of your witnesses, before the end of today's session.

4. We would wish to be in a position to be able to start to hear the promoter's response in today's sitting so, if possible, we'd encourage the petitioner to try to conclude by about 7.00 p.m. this evening, although the Committee will sit until 8.00, obviously. But, as I've said, we are aware this is an important issue but that's just for guidance.

5. There may be Divisions in the house during our hearings this afternoon, in which case, of course, we'll suspend and resume afterwards. In any event, after two hours, I will allow a short break for comfort stop. So on that basis, over to you, Mr Cameron.

### **Greater Manchester Partners**

6. MR CAMERON KC: Thank you, sir. I'm very conscious of the time, and equally conscious of how important this is to my clients, so we will speed along as fast as we can. So just before I start, good news to report. We said last week that we would try and engage on agreements and we have reached agreements in relation to cost. So we've narrowed the issues. We've reached agreement on the ability to build an underground station next to the classic station, that it is possible and not materially different from the impact of building a surface station. And, on engagement, we've agreed a schedule. Now, in that past, sir, I would have read all that into the transcript but I hope you're going to tell me not to do that so that I can get on with the evidence.

7. CHAIR: That's fine

8. MR CAMERON KC: But I draw your attention to those documents, sir.

9. CHAIR: Excellent. Well, we'll be provided with those, presumably. We've got them already, good.

### **Evidence of Mr Palmer**

10. MR CAMERON KC: So, Mr Palmer, we're back to your evidence. You're still dealing with the robustness of operation of the surface turnback station, so we're dealing with the Hybrid Bill proposals still and we were about to get on to the subject of stepping back. I think the Committee understand what stepping back is but you deal with this at your slide 12, which we've got in front of us.

11. MR PALMER: I don't appear to have a working set of slides on the screen in front of me.

12. MR CAMERON KC: That is a problem. You definitely need a working machine.

13. CHAIR: One is appearing, seamlessly.

14. MR CAMERON KC: There we go.

15. MR PALMER: Thank you very much.

16. CHAIR: Good.

17. MR CAMERON KC: Right. Slide 12, stepping back. What effect will the use of stepping back have on the robustness and reliability of the surface turnback station?

18. MR PALMER: In my professional opinion, the use of stepping back for the surface turnback station will contribute to a lowering in the performance of the surface turnback station, in terms of robustness, in terms of reliability and in terms of the ability of the station to accommodate delay. This isn't just my professional opinion; this is HS2's professional opinion in the information that they have published.

19. MR CAMERON KC: And can you explain why you are of that opinion?

20. MR PALMER: So, HS2's original plan was that the driver would change ends. The amount of time allocated for that activity was not deemed to be sufficient, although we didn't find out until three months after HS2 had made that position public. Stepping back requires additional drivers. Stepping back potentially requires additional station infrastructure and stepping back implies that the driver that brings the train into the station, is not the driver that takes the train out. So because you are changing drivers, in a way that if you've ever done a coach journey anywhere, that the coach will go to a central location, one driver will get off, a new driver will get on and that journey will continue, you are reliant on all of the different pieces of the puzzle all fitting together exactly at the right time, every time, for that to work, and HS2, by their own admission, have admitted that there is no precedent within the UK for stepping back to be used in this specific scenario and that it represents an unproven assumption.

21. MR CAMERON KC: And on your slide, you say that HS2 have given the example of the Victoria Line on London Underground and you say that is inappropriate. Why do you say that?

22. MR PALMER: So, the types of operation where stepping back can be used successfully are fully segregated metro-like operations. So we're talking things like London Underground. We're talking things like Manchester Metrolink, Edinburgh Trams. We're talking about routes that are over relatively short distances with very high frequency service where the average speed of a service is relatively low, because they stop very frequently to pick up passengers and because every service operates over the same route in the same direction, it's less of a risk associated with stepping back because the time gap involved, there will always be the second service coming along

behind and the driver will always be getting into a vehicle going back to where they came from. Those specific criteria cannot be applied to the operation of NPR services through Manchester Piccadilly where HS2 are proposing to use it.

23. CHAIR: Can I jump in there to ask a question? Why does the speed matter, given that this is effectively a terminus station? So how is the speed relevant?

24. MR PALMER: So, from a speed perspective, because you have a lower overall speed, you can run a much higher frequency of service. So the times between vehicles are reduced and so the effect of one driver having to step back to pick up the service behind, is reduced, because as you've seen when you go down on to the London Underground at certain locations, you can stand on the platform and if you did this at say the Waterloo and City terminus at Bank or at London Waterloo, at Waterloo, you can watch the vehicle go out into the siding, watch the driver get out, watch the new driver get in and you watch the train come back. The use of stepping back is mandated because of the infrastructure constraints that are required because of the speed.

25. CHAIR: Okay.

26. MR PALMER: So you have a situation where you have to use the stepping back to meet the requirement combination of very high frequency – and we're initially talking 10-15 to 20 trains an hour or greater, whereas here on NPR, the service frequency that the promoter has put forward is, at the moment, a maximum of eight.

27. Also, the locations where stepping back – that are traditionally used on those closed types of metro systems, are at the ends of the respective routes. They're not in the middle, which is what HS2 are proposing here.

28. CHAIR: Right. I don't know whether you're looking for me to nod in agreement.

29. MR PALMER: No, I'm looking at you as you asked the question and I'm waiting –

30. CHAIR: I think I vaguely understand. I mean, I suppose the bit that confuses me is – well, no, I'll take your word for it at this stage and we'll come to this later, maybe.

31. MR PALMER: Okay.

32. CHAIR: Mr Cameron?

33. MR CAMERON KC: Thank you. TransPennine Express you say would be a more appropriate comparison and the Victoria Line. TransPennine Express, can we just go in your slides to slide 15, I think it is, A67(15).

34. MR PALMER: Yes.

35. MR CAMERON KC: What lessons can we learn from TransPennine Express?

36. CHAIR: You're speaking to two members with a station served by that network and there's a lot we could answer to that, isn't there? Not very many lessons.

37. MR PALMER: I will keep the points salient, given the time that we have available to us.

38. CHAIR: Yes, please.

39. MR PALMER: Right. So we've chosen TransPennine Express as a relevant alternative as the services that are proposed to be operated by NPR, will operate between origins and destinations, which are currently served by TransPennine Express services, nominally from Liverpool and Newcastle. The services that are currently operated by TransPennine Express are likely to be removed from the timetable when NPR services start operating through, to avoid the duplication of services and carrying around fresh air.

40. Because of the locations that are being served by NPR, it is likely that the routes that the NPR services will take when they are on the classic infrastructure, so when they've gone beyond Marsden on one side and when they've gone beyond – and, apologies, I can't remember the junction on the other side towards Liverpool – they'll be operating on the same tracks and likely to have a similar type of interaction with other services around them that TransPennine Express has today.

41. And finally, based on the information provided by HS2 in the document that they provided setting out their calculations for the number of additional drivers that stepping back would cost, they indicated for the service pattern that they assessed, which was four trains an hour between Liverpool and Leeds, noting this service is eventually

proposed to run between Liverpool and Newcastle – that they would require depots at Liverpool, Manchester and Leeds for their train crew.

42. Our understanding is that TransPennine Express also have depots at Liverpool, Manchester and Leeds for their train crew, and because of that – and you’ve seen the way that the delays have affected the TransPennine network because drivers don’t necessarily always drive a complete route from one end to the other – we felt that as HS2 were effectively proposing a similar method of operation, that TransPennine Express was the closest operator to replicate that.

43. What the chart tells us is that only 50% of TransPennine Express services across their whole network – so we haven’t focused on one particular route, we’ve given them the benefit of the doubt, we’ve taken it across the whole network – arrive within one minute. Now, you may think arriving within one minute, ‘Fantastic, I wish I could have a train service like that’; we’ll come on to what that means in relation to HS2’s performance data in a later slide.

44. What this table also tells us is that there is a further 30% of services arrive between one minute and five minutes late. And as we’ll see when we look at HS2’s performance metrics, that level of service arriving late delivers a hammer blow to the level of performance you can expect with a surface station using a turnback operation.

45. MR CAMERON KC: Can we go from TransPennine Express to A67(14)? And you’ve got various quotations there; I’ll lead you, but those are from HS2’s documents, I think.

46. MR PALMER: That’s correct.

47. MR CAMERON KC: You get a minute’s delay, what happens according to HS2?

48. MR PALMER: According to HS2, the application of more than one minute’s delay in the platform for reversing services incurs significant reactionary delay. So, what this is saying is if you put one minute’s delay into the top of the machine, turn the handle, the new number that comes out at the bottom isn’t going to be one or two, you mean that this is happening on a regular basis to services, and based the only 50% of services arriving within one minute which means 50% are outside of one minute, your

one minute that comes in at the top has a large chance coming out at the bottom of the sausage machine and being three, four, five or six minutes late.

49. CHAIR: So, the argument being that the NPR services which are likely to operate with margins of considerable station delay will impact then on the ability to do the turnback for the HS2 services.

50. MR PALMER: What will happen is that, as the NPR services get later, they will come onto HS2's infrastructure running late. They will arrive at the station throat where you have all of those complicated bits of point work, and they will even need to be held to let something else out of the platform, making the inbound train later, or the train in the platform is held to allow your inbound service in, so your train departing the platform becomes late.

51. The later they get, the more of the impact you have on the ability of the trains coming up from the spur to get into the platform on time then be able to leave on time.

52. CHAIR: If we have an underground through station at Manchester, that still occurs though, doesn't it? If you're saying that the NPR delays are going to delay because of the points at one spot or because of the capacity at the station, that would occur anyway, wouldn't it?

53. MR PALMER: The inbound delays will occur. The difference is how the station handles it. So, with the surface station, you have five minutes to complete your activities in the platform and you have a further two or three minutes either side to traverse through the junction. So, per service to go – coming into the station, through the station and back out again, you take up a maximum of 11 minutes, for argument's sake, assuming you can meet the five-minute reversal time.

54. On the underground station, because you only have a three-minute dwell in the platform and you have no conflict coming into the platform and you have no conflict leaving the platform, you don't have 11 minutes, you may only actually occupy the station throat on one side, the station throat on the other and the platform in the middle, for at most five minutes. So, you suddenly have six minutes more of free space to accommodate that delay that you've imported from another network.

55. CHAIR: Okay. I understand.

56. MR CAMERON KC: Thank you. So moving to the end of the analysis – sorry you wanted to say something else?

57. MR PALMER: I was just going to pick up point three on the slide.

58. MR CAMERON KC: Please do.

59. MR PALMER: Again, direct quote from HS2, ‘Based on results calculated, the timetable becomes unstable if services either arrive at, or accrue, more than two minutes’ delay at Manchester Piccadilly. So, ask yourself this: how many times have you been on a journey where you’ve just missed the sequence of the traffic lights and you end up picking up a couple of minutes delay? Or how many times have you been on a train and the service has had a slightly longer dwell because of a large number of passengers? It happens fairly frequently and it’s something that the network tries to build in time to accommodate.

60. What HS2 are saying is that if your services regularly accrue two minutes’ delay or more – and we’ve already identified that potentially 50% of the NPR services will accrue that level of delay – phrase, ‘The timetable becomes unstable’, meaning the infrastructure cannot operate the timetable that has been put forward. These assessments have been done on the basis of the four NPR through services per hour between Liverpool, Leeds and onto Newcastle. They haven’t been tested for the higher service frequencies.

61. So, if the numbers you’re getting at the very beginning of NPR operation are at this level, imagine the ramifications as you were to start to increase the service frequency above six through services per hour, or eight through services per hour.

62. MR CAMERON KC: Thank you. Can we just go to A67(16), which is the summary of the points on the turnback station, your criticism of it? You’ve just covered three and four. Two, you’ve covered before; that’s where we need additional infrastructure.

63. MR PALMER: Yeah.

64. MR CAMERON KC: And you've dealt with the HS2, so that is the Hybrid Bill proposal. Let us now turn to the GM suggested alternative if we can, and I want to go to slide A67(17). You've already described the station so I don't need to ask you about that, but can I ask you: the big difference on cost is cost of a turnback facility in a cavern under central Manchester, that's the big item on cost where there's a difference. Would you need turnback facility in a cavern under central Manchester?

65. MR PALMER: No.

66. MR CAMERON KC: Why not?

67. MR PALMER: There are three general areas where you wouldn't need a turnback facility. One, the cost associated with that facility that has been put forward by HS2 would not make it through the early stages of a development project. If there was an operational requirement for such a facility and the cost of delivering that facility was presented as a project, we would be asked to go away and rethink either whether that requirement was needed or whether there was an alternative way of delivering that requirement at a much reduced cost.

68. Secondly, if you look in HS2's rolling stock technical specification, there are several references to the fact that the train must be able to move as long as there is power coming from the overhead wires. Now, the train may not be able to move with passengers on board, but the train can still be able to be moved if there is power. So, if there is a fault in any of the major systems onboard, the train should be able to move.

69. When we talk about timetable planning in the underground station, there are large time gaps between services from an HS2 perspective and smaller time gaps between NPR services where, if there was a problem, we would look to use those time gaps before we then effectively instructed the train to move elsewhere.

70. And the final reason why we don't believe that a turnback facility is required is that from a planning perspective, the assumption was always that we would only look to run more than eight through services per hour at the point where HS2 were no longer splitting and joining trains for strengthening and de-strengthening purposes, so there were no empty stock movements that needed to take place and so coincidentally there was no requirement for vehicles to be parked in the siding for a period of time.

71. The question that has been cropping up and cropping up and cropping up is, 'Well, what happens if a train fails in a platform? Well, if it's an HS2 train and it's 200 meters long, then we use the other end of the platform. We don't need a spare siding for that to happen. If it's a 400 metre long train, as we've already identified, the rolling stock specifications says you can actually run the train through to somewhere else because it has the ability to move because it has power.

72. And finally, the other reason is that again, because we were looking at sending HS2 services through, if there is a problem with a particular vehicle that means it needs to come out of the station, we wouldn't look to move it to a location that was difficult to access, that had been expensive to be procured, that would only potentially be used on a very infrequent basis. We would look to send that vehicle somewhere else, like the existing maintenance facility at Crewe where the facilities would be there to actually look at the train, inspect the train, find out what the problem was, fix the problem and put the vehicle back into service.

73. MR CAMERON KC: If a different view is taken and the view is taken that you do need a turnback, does it have to be in a cavern under central Manchester or could it be somewhere else?

74. MR PALMER: It doesn't have to be a cavern under central Manchester, it could be anywhere else, and actually, from an operational perspective, it will be better off on the surface where road access was easy, so that if you needed to bring people in with the right tools and equipment, you would want to do it that way rather than sticking it underground.

75. MR CAMERON KC: Is there anything else on turnback and the need for it?

76. MR PALMER: Not that I can think of off the top of my head but I'm sure I will be asked under cross-examination.

77. MR CAMERON KC: Next subject: capacity of the through station and for this we have slide A67(19) please? The essential question is how do you achieve adequate capacity with four platforms when compared to six in the surface turnback?

78. MR PALMER: So on the surface – and it's a design requirement that also applies

to the underground – there is something called ‘platform sharing’ where you can effectively have one train at one end of the platform and one train at the other end of the platform like you have in most petrol stations where you have two sets of pumps next to each other.

79. All of the calculations that you see on the screen are based on HS2’s assumptions for platform reoccupation times and dwell times. What this shows is that, under the three scenarios for the number of through services, the underground station platform can deliver the capacity required by generally being between 60-80%.

80. Now, we had an artificially imposed constraint that we put upon ourselves to only use 75% of platform capacity, because that meant we had 25% available to cope with the kind of delays that you may expect to see, such as large groups of people boarding, people with buggies, people with bikes, those kind of things, and through the use of platform sharing, we can actually reduce that nominally 80% down to something in the region of 60%.

81. So for the service specifications that have been set out for scenarios two, three and four, assuming that all the London terminators are extended through somewhere either as empties which we don’t believe any value to the project, whereas passenger services that would add value to the project, we can deliver all of that within the station and still have capacity to spare.

82. MR CAMERON KC: Thank you. Now, I’d like to deal with comparative performance –

83. CHAIR: Mr Cameroon, can I just come in there again because I do get confused – I don’t know if my colleagues are the same on this – the station capacity issue versus an above ground station capacity. Under cross-examination from Mr Mould, Mr Lax agreed that the overground station as proposed would have capacity for, as memory serves, 11 trains per hour. The issue of 15 or more, which would be more than sufficient to accommodate the various scenarios on Northern Powerhouse Rail, the announced one and then obviously Transport for the North’s proposed enhanced NPR, so I think it was Scenario 3 if memory serves.

84. So this issue of capacity; I’m confused. Are we saying that the above ground

station doesn't have the capacity and wouldn't be able to accommodate the 11 trains per hour, which HS2 and NPR think, or that it would?

85. MR PALMER: So the surface station can only accommodate up to a maximum of eight through and three terminating services. That is the maximum it can accommodate without additional infrastructure in the form of viaducts, grade-separated junctions, track point work and signalling changes.

86. CHAIR: And that is enough to accommodate HS2 and all Northern Powerhouse Rail as outlined in the integrated rail plan, is it?

87. MR PALMER: Only up to that point. It will not accommodate anything beyond that.

88. CHAIR: Any growth.

89. MR PALMER: What we've said with the underground station, and we've demonstrated with these numbers, is that the capacity exists beyond those numbers by quite some significant margin.

90. CHAIR: The 11 was based on, was it an eight-minute turnaround?

91. MR PALMER: The 11 trains an hour assumed a maximum – was planned on the basis of a five-minute turnaround time, but with a three-minute platform reoccupation. But the station will accommodate an eight-minute reversal time with a three-minute reoccupation, but that pushes the capacity of the station to its absolute maximum.

92. CHAIR: Which is the 11, the eight plus three –

93. MR PALMER: The 11.

94. CHAIR: Right.

95. MR PALMER: So five plus three gives you your 11 with a small amount of wiggle room. Eight plus three gives you your 11 with no spare space.

96. CHAIR: Okay, thank you.

97. MR CAMERON KC: And on your slide 19 you're dealing with 15 trains and

hour –

98. MR PALMER: Yeah.

99. MR CAMERON KC: Which, going back to the earlier evidence we have, it's your evidence on the capacity of the spur.

100. MR PALMER: Correct.

101. MR CAMERON KC: I was going to go on to slide 21, please, and this is headed, 'Petitioner performance results; surface against underground. Can you just explain what this shows? This is a comparison I think between, as it says, surface and underground.

102. MR PALMER: What we did here was to undertake an exercise where the only thing that differed was the infrastructure design. What we did is we did what's known as a stress test and what we did, as it says on the left, is that for different time periods of the day we added more delay.

103. We started small with a small number of services delayed by a small amount of time. We allowed that delay to be applied over a two-hour window. Then we left the gap to enable things to calm down a bit, and then we added another amount of delay. The idea being to see at what point did the performance of the two designs with the same timetable information, with the same journey times, with the same assumptions in terms of HS2's five-minute reversal, the petitioners' three-minute through dwell time, to see the difference in when the performance of those networks dropped below a level that the Committee would deem to be acceptable, or the traveling public would deem to be acceptable.

104. What we found was that, regardless of the option we tested, whether we looked at nine, whether we looked at 11 or whether we looked at 15, the underground station could cope with three hours more of delay and its knock-on effects compared to the surface station.

105. So, if you had a major incident or if you had a large delay that happened at the same time on both the surface station and the underground station, the underground station, that delay would be resolved three hours faster. Or if you look at it another way, for the delay to be resolved at the same time, the underground station could absorb a

delay of a larger magnitude and still have services returned to normal at the same time as a surface station, which had a delay of a smaller magnitude.

106. MR CAMERON KC: If we take the Chair's last question on the 11 trains per hour, on your analysis, why does the underground through station perform so much better than the surface turnback on the basis of this analysis?

107. MR PALMER: Because we do not have the conflicting moves in the station throat. We also do not have the large amount of time in the platform so we can utilise the gaps between through services more effectively. And actually, on the 11 trains per hour scenario that we have tested here, we maintained the London terminating services in both models and we only applied delay in all of these models to through services, so we actually protected the London terminators as part of this analysis.

108. But what this is showing, even at 11 trains per hour, is the additional time available because you have larger gaps between services from a timetabling perspective, because you're not reversing, because you have less time moving through the junctions because there are no directly conflicting moves underground as there is on the surface, enables the station to recover faster and enables a performance impact to be mitigated quicker.

109. MR CAMERON KC: Thank you. Now, I'm conscious of the time and the other evidence we've got to go through, I'm not planning to ask you any other questions but is there anything else you wish to add before you're cross-examined?

110. MR PALMER: Not that I can think of at this moment in time.

111. MR CAMERON KC: Thank you.

112. CHAIR: Thank you, Mr Cameron. Mr Mould.

113. MR MOULD KC (DfT): Thank you. Mr Palmer, you prepared a very detailed and learned report from which you've drawn your exhibits. That report is at A71 in the pack. I don't know about others; I went through a prodigious supply of wet towels in order to get my head around what it said, but I got there in the end. But can we turn please first of all to A67(16)?

114. I think picking up where the Chairman was with you in the question he put a minute ago, the way point one is expressed in these terms, the station is not designed to accommodate more than three HS2 services per hour and eight NPR through services per hour. I understand that, in order to present your argument, it was convenient to express it in terms of what the station was not designed to do more than, but the essential corollary to that is that the station is designed to accommodate up to three HS2 terminating services per hour and eight Northern Powerhouse Rail through services per hour. That's correct, isn't it?

115. MR PALMER: Yes, that is correct.

116. MR MOULD KC (DfT): Thank you. So then if we turn, please to your report at A71(71), at paragraph 6.3.5 and when we get there, I'll just set the context for this. You have in your report a section six where you examine the credentials of the four-platform underground alternative, don't you? It's section six of the report.

117. MR PALMER: That's what I'm looking at on the screen.

118. MR MOULD KC (DfT): Yes. And you go through each of the scenarios that Mr Lax tells us about and we here have alighted upon Scenario 3, haven't we?

119. MR PALMER: Yes.

120. MR MOULD KC (DfT): So we're here looking at three HS2 terminators, eight NPR through services.

121. MR PALMER: That's what the text indicates, yes.

122. MR MOULD KC (DfT): What we knew last week as the GM partners and Transport for the North preferred network.

123. MR PALMER: If that's what was agreed last week then, yes.

124. MR MOULD KC (DfT): Thank you. And we can see that the text says, 'Figure 6-3 presents a platform occupancy diagram for the potential maximum capacity for the underground through station. This indicates that the 11 services per hour, eight through and three terminating services, can be accommodated with four platforms. Maximum throughput utilisation values are below 75%.

125. The point is this, isn't it, Mr Palmer? The thing you stressed to the Committee a few minutes ago that the surface turnback station is only able to operate with up to three – or a maximum of three HS2 terminating services and eight NPR three services per hour is exactly the same state of affairs so far as the four-platform station is concerned as well, isn't it?

126. MR PALMER: The four-platform underground station can accommodate eight through and three terminating services but the underground station can accommodate more.

127. MR MOULD KC (DfT): It can't accommodate more on the basis of the three HS2 services terminating and returning from platform to London, can it? It can't accommodate more unless the HS2 services run through to some westerly point beyond the platforms.

128. MR PALMER: So, the design specification for HS2 indicates that platform sharing is a design requirement that would apply to both sets of station design. Platform sharing permits two NPR through services to occupy a platform at the same time.

129. MR MOULD KC (DfT): Can you answer my question, please? Is the answer yes or no? Don't fence with me, Mr Palmer. What's the answer? Unless you assume that the HS2 services are running through to a point beyond platform, is the four-platform underground station able to accommodate more than three HS2 services and eight NPR services?

130. MR PALMER: Yes, it can.

131. MR MOULD KC (DfT): Why?

132. MR PALMER: Because platform sharing allows more NPR through services to use the outer pair of platforms which the overground surface station cannot.

133. MR MOULD KC (DfT): Let us look at page A71(74) please because we're here looking at your diagram of the occupation of the four platforms on scenario 4, aren't we?

134. MR PALMER: Yes.

135. MR MOULD KC (DfT): Right. Look at the dwell time that is available for HS2 services. Four minutes.

136. MR PALMER: Yes, this is the 15 trains an hour, all through.

137. MR MOULD KC (DfT): Each of those trains is assumed to be running through, hence the dwell time of four minutes.

138. MR PALMER: Yes.

139. MR MOULD KC (DfT): Right. Turn back to page A74(72), please. This is scenario 3.

140. MR PALMER: Correct.

141. MR MOULD KC (DfT): Platforms two and three are devoted to HS2 terminating services, each assumed to dwell on platform for 25 minutes.

142. MR PALMER: Correct.

143. MR MOULD KC (DfT): Right. There is no room, is there, for the station to operate at a capacity of more than 11 trains, three HS2 and eight NPR unless you run the HS2 services through with a four-minute dwell time rather than them terminating with a 25-minute dwell. That is the position as set out in your report, Mr Palmer, as I've just shown you, isn't it?

144. MR PALMER: That is the position that is set out in the report.

145. MR MOULD KC (DfT): Thank you. And it is for that reason, if you turn to page A71(76), that you say at ~~6.3.20~~ – A71(76), please – 'To accommodate the full capacity of the spur, the underground through station assumes that new connectivity is provided between London and other UK locations beyond Manchester'. That is required in order to accommodate the three HS2 services running beyond the platforms at Manchester Piccadilly four-platform station, isn't it?

146. MR PALMER: On the basis of the assumptions made in this report, yes.

147. MR MOULD KC (DfT): Right.

148. MR PALMER: Those assumptions have changed since this report was produced, as indicated by HS2's response to the statement of common ground.

149. MR MOULD KC (DfT): I don't know what you're talking about. This is your evidence to the Committee, isn't it, this report?

150. MR PALMER: This is my report, yes.

151. MR MOULD KC (DfT): And this is a report, which was prepared as your written evidence to this Committee. It says so at the beginning of it.

152. MR PALMER: Yes.

153. MR MOULD KC (DfT): Right. Is there anything more to say?

154. MR PALMER: Not at this stage, no.

155. MR MOULD KC (DfT): Thank you. ~~6.3.21~~, you go on to consider in your report, in your evidence to the Committee, how you might provide what you describe as that, 'new connectivity between London and other UK locations beyond Manchester', in order to accommodate a station operation with four platforms with HS2 trains not terminating, as this Bill assumes, but rather, running beyond the station platform to some, as yet undefined, westerly point. That you're doing in ~~6.3.21~~, isn't it?

156. MR PALMER: That is correct.

157. MR MOULD KC (DfT): Yes. The third of those is expressed in these terms. '400-metre trains continue on to a single destination where infrastructure capable of supporting 400-metre trains would need to be provided', in other words, a turnback facility.

158. MR PALMER: No, 'a single destination where infrastructure capable of supporting 400-metre trains would need to be provided', could also be a platform in a station.

159. MR MOULD KC (DfT): Right. What would it be envisaged that that platform would be doing in relation to those 400-metre trains? Why would they be going to that platform?

160. MR PALMER: They would be going to that platform to allow passengers to travel between Manchester Piccadilly and that platform location.

161. MR MOULD KC (DfT): Right. So, it assumes that HS2 services are running through to more northerly or westerly destinations, which is not the basis upon which this Bill has been put forward, is it?

162. MR PALMER: No, it is not the basis that the Bill has been put forward.

163. MR MOULD KC (DfT): And you haven't identified any station or any track, either existing or in plan, which would enable a 400-metre train running north of Manchester Piccadilly to be berthed, in order to disgorge passengers, have you?

164. MR PALMER: No, and we would not be recommending that a 400-metre long train continue beyond Manchester Piccadilly for precisely the point you're trying to make, because of the infrastructure implications and the cost required to deliver that capability. Our recommendation would be either one of the first of second points where a 200-metre long train goes forward to other locations on the existing classic network, where 200-metre long platforms exist at a large number of places and wouldn't necessarily need any modifications to accommodate the train service.

165. MR MOULD KC (DfT): Is there any evidence in your report that examines the capital expenditure implications of running HS2 trains north of Manchester Piccadilly on some indeterminate route or train service specification on stations to the north and west?

166. MR PALMER: No.

167. MR MOULD KC (DfT): Right.

168. MR PALMER: That did not form part of the scope of the report that I was asked to produce.

169. MR MOULD KC (DfT): But in so far as the proposition is that the four-platform underground station can provide a more intensive operation than the surface station is unable to do, that is an essential element of the analysis, isn't it?

170. MR PALMER: No.

171. MR MOULD KC (DfT): Why not?

172. MR PALMER: The analysis I was asked to undertake was to determine if the provision –

173. MR MOULD KC (DfT): Different question. I didn't ask you whether you'd been asked to do it. I asked you to confirm to the Committee that for the reasons you've given, it is an essential element of the analysis. You should have been asked to do it, shouldn't you?

174. MR PALMER: I cannot answer that part of the question because that is not part of the technical detail that I was asked to investigate.

175. MR MOULD KC (DfT): Well, these HS2 services running through the four-platform station to some undetermined northerly destination, we can agree, by definition, they have to run through to somewhere –

176. MR PALMER: Yes.

177. MR MOULD KC (DfT): – to terminate, don't they?

178. MR PALMER: Yes.

179. MR MOULD KC (DfT): Right. So the question whether there is that somewhere and, if not, how much it would cost to create that somewhere, are essential to the operation of your station in accommodating HS2 services on this 15 train per hour scenario, aren't they?

180. MR PALMER: Yes.

181. MR MOULD KC (DfT): Right. So, that which is essential to the operation of the four-platform station, on the single growth scenario that you say this station can achieve, which our station can't, you have not – you accept it's essential but you weren't asked to explore it.

182. MR PALMER: That is correct

183. MR MOULD KC (DfT): Thank you very much. We have sought to explore it, staying as close as we can to the principle upon which this Bill is founded, that is to say

that HS2 services should terminate at Manchester Piccadilly and return to London, and the solution we have put forward is that there would need to be a facility provided north of Manchester Piccadilly four-platform station, at which those trains could dwell for 25 minutes and turn back. You understand the logic of our position, don't you?

184. MR PALMER: Yes, I can.

185. MR MOULD KC (DfT): Yes. There is no defined proposition in order to achieve that, that essential element of the operation of your station, that is before the Committee to consider, is there? There's no alternative proposition, which has been put forward and costed in your evidence or in any other evidence, which the GM Partners have put forward.

186. MR PALMER: No.

187. MR MOULD KC (DfT): No. And the only cost that has been put forward is the cost that is set out in the updated costs schedule. Shall we just put up P424(3), please? ~~CanLet~~ ~~wme~~ blow up so we can see the two rights of – we've blown up so we can see the left-hand table which identifies the items and we can just see there, 'Underground turnback sidings'. Do you see that? Not required for six platforms, whether at surface or underground. And if we go along to the right-hand side where we have the four-platform alternatives, not included ~~ais~~ is a cost in the costings, as you understand it, for Greater Manchester's proposition. That's right, isn't it?

188. MR PALMER: Correct.

189. MR MOULD KC (DfT): You've confirmed that it's not included in your evidence today. If it was to be included, the only cost that is before the Committee is a cost of £1.278 million, isn't it?

190. MR PALMER: That is your cost, yes. I believe that is an over-optimistic cost.

191. MR MOULD KC (DfT): Well, you may be right but there's no other cost for the Committee to compare it to, is there?

192. MR PALMER: Not at this stage, no.

193. MR MOULD KC (DfT): Well, is there going to be one drawn from the pocket at

some stage between now and tomorrow afternoon?

194. MR PALMER: That may be a conversation that is had internally with –

195. MR MOULD KC (DfT): Well, I hope it won't be.

196. MR PALMER: I cannot give you an alternative cost for the provision of a set of turnback sidings.

197. MR MOULD KC (DfT): I said million. I was doing you a great favour. It's a billion rather than 'million', yes.

198. MR PALMER: I'm not in a position, as I'm not a cost expert to be able to provide you with a number.

199. MR MOULD KC (DfT): No.

200. MR PALMER: What I would say is that the cost that you have put forward, to me, from an operational perspective, seem excessive and I believe that there would be an alternative cost for the provision of those sidings, which would be orders of magnitude smaller. And, furthermore, the provision of your turnback facility does not add any benefit to the operation of the railway, from an accepting that there may be a performance benefit, but it does not add any further value to the proposition. It only adds an operational cost.

201. MR MOULD KC (DfT): Well, there's one benefit that it adds. It enables the HS2 railway to do what this Bill seeks of it, which is to operate services from London Euston to the south, to Manchester Piccadilly in the north and to turn back again. That seems to me to be rather an important benefit.

202. MR PALMER: That's assuming that you terminate those services and you do not run them somewhere else to deliver added value to the project.

203. MR MOULD KC (DfT): But that's the assumption on which this Bill scheme has been put forward, isn't it?

204. MR PALMER: Then we have a difference of opinion as to –

205. MR MOULD KC (DfT): We do indeed.

206. MR PALMER: – what the facility in the station that we’re discussing, should be achieving.

207. MR MOULD KC (DfT): Yes. We do indeed have a difference, because you have allowed yourself, in exploring scenario 4, to run on to consider a growth path, which as we saw with Mr Lax’s evidence last week, has no basis in any current or proposed investment plan and which it is not envisaged – I’ll put it as neutrally as I can – not envisaged by the HS2 Bill.

208. MR PALMER: And, as Mr Lax also confirmed yesterday, that the timelines for the IRP stretch up to 2050 and that it would be inadvisable to assume that the railway that you have put forward as part of your Bill, will not require additional infrastructure or services beyond the date that you bring the option that you’ve put forward as part of your submission, into service.

209. MR MOULD KC (DfT): Well, I’m not going to presume to debate that with you. That’s a matter for Parliament. This is primary legislation before this House and I’m going to leave Parliament to consider that questions. Yes. There was a hint, if we just turn back to page A71(75), there was a hint in the evidence that you gave, not foreshadowed in your report but nevertheless offered to the Committee a few moments ago, that somehow there was an element of double counting in proposing a turnback facility because it was fulfilling something of the same function of the stabling facility that is for empty coaching stock, that is seen as possibly needed under the HS2 scheme. You deal with that question in your report at paragraph 6.3.12 through to 6.3.19, don’t you?

210. MR PALMER: Yes.

211. MR MOULD KC (DfT): The need for that stabling facility. And you say, in paragraph 6.3.18, ‘Whichever station option is taken forward, the provision of a stabling facility close to Manchester Piccadilly would permit the stabling of spare HS2 trains, meaning that for services that travel beyond Manchester, they could remain at 200 metres long’.

212. You envisaged, didn’t you, that that facility, if it was needed for one station option, it would be needed for the other as well because it was predicated, at this part of

your evidence, upon Manchester Piccadilly running on a wholly through-station proposition.

213. MR PALMER: So the evidence that you see in front of you was predicated on the basis that because 400-metre long services could not be accommodated on the classic infrastructure without a significant cost, and that we were proposing that we would only be looking to operate services beyond Manchester Piccadilly when HS2 services no longer needed to be strengthened and de-strengthened, that the sidings provided at Ardwick would only be required for HS2 services during strengthening and de-strengthening. After that point, the question then decides, do you send one two-hundred-metre-long train forward or do you send two two-hundred-metre-long trains forward? What was putting in here was that if you were to look at – and it's got it in 17 – is that if you were to look at operating services through, before you were running to 400-metre long trains, so you're effectively only wanting to send one service through, you would still have to have a set of sidings to park the spare HS2 unit. But that is the sidings that HS2 themselves have acknowledged they need but have not included in the costs.

214. MR MOULD KC (DfT): Let me – well, I'll come back to that in a minute. Let me just see if I can approach this in a different way. There appears to be a fundamental issue between us as to whether the Committee should proceed on the basis that this Bill is contemplating, as an essential component of the train service specification, HS2 services terminating at Manchester and returning to London on the network or some other form of, as yet unspecified and unplanned, train service specification that involves HS2 services running beyond Manchester. You mentioned that to me a minute ago.

215. MR PALMER: Yes.

216. MR MOULD KC (DfT): Right. In the event that the former is the approach, you would need – and we were nevertheless seeking to achieve your 15 trains per hour growth –

217. MR PALMER: Yes.

218. MR MOULD KC (DfT): – intensity of operations – by definition, you would need somewhere to the north to be able to turn the HS2 services back so they could

return to London, wouldn't you?

219. MR PALMER: Yes.

220. MR MOULD KC (DfT): They would disgorge their passengers after the completion of their northbound journey ~~on~~ platform 2 or 3 in your underground station, yes? They would then run north to spend whatever was left of the 25 minutes being cleaned etc. Then they would return to platform 2 or 3, pick up their southbound passengers and make their journey southwards, yes?

221. MR PALMER: Yes.

222. MR MOULD KC (DfT): Well, it's obvious, isn't it, that whatever facility, whether it be existing railway or a turnback facility or otherwise that was going to enable that to happen, would need to be wholly separate from any stabling facility to accommodate ~~empty~~ coaching stock. It's obvious, isn't it? Because those are completely different functions and they would each need to be satisfied by the provision of appropriate infrastructure.

223. MR PALMER: That infrastructure could be provided at the same location.

224. MR MOULD KC (DfT): Well, it would need, in that case, to be a four-platform, rather than a two-platform facility, wouldn't it?

225. MR PALMER: It could be, yes. It would depend –

226. MR MOULD KC (DfT): Well, it would need to be –

227. MR PALMER: – on the length of sidings and the amount of turnouts that you have within the siding length.

228. MR MOULD KC (DfT): It implies that it would be a larger facility than one which was simply being provided to accommodate empty coaching stock, wouldn't it?

229. MR PALMER: If you were to apply both to the same location then, yes, you would need a bigger facility.

230. MR MOULD KC (DfT): Thank you very much. But, in any event, if we come back to P424(3), because we want to be fair to you, we have assumed a cost for the

stabling sidings for the HS2 baseline scheme and not applied that cost to the Manchester – to the four-platform scheme. If you just blow up – you can see a line, ‘Overground empty coaching stock, ECS sidings’, we have assumed a cost of £56 million for that and if you follow that line across, we haven’t suggested that that cost should be included in relation to any of the four-platform propositions. So, in fact, we have been fair to you in that respect, haven’t we? Arguably, too fair.

231. MR PALMER: You have been in that respect. You have not been fair in the costs that you’ve asserted for the line above at £1.278 billion.

232. MR MOULD KC (DfT): Well, we can’t judge whether we’re being fair or not because there’s no other cost in play to be able to make that judgment, is there? We’ve been over that.

233. MR PALMER: Not in terms of evidence in front of this Committee, no.

234. MR MOULD KC (DfT): Right. Well, can I just turn then to another point? Could we go back to A71(72), please? On your scenario, which involves HS2 services terminating at Manchester, in other words, scenario 3, the Transport for the North GM Preferred Network, we can see on the chart, platforms 2 and 3, we can see in each case the dwell time for the HS2 terminating services, 25 minutes, and we can see that in each case, there’s a limited amount of time in between occupation of those platforms by HS2 services, which is free, as it were, from a train being present at the station, yeah?

235. MR PALMER: That’s correct.

236. MR MOULD KC (DfT): In the event that one or other or both of those services were to be delayed, for whatever reason, there would be very little time, wouldn’t there, to allow for that perturbation to be accommodated before it would be necessary to bring HS2 services on to either one or other of platforms 1 and 4. Because HS2’s terminating services have to dwell for such a significant period of the hour, that must follow, mustn’t it?

237. MR PALMER: Not necessarily, no.

238. MR MOULD KC (DfT): Why not?

239. MR PALMER: Because the amount of time that is specified as shown there is the entirety for the amount of time available but does not take into account the fact that HS2 themselves have stated that the minimum amount of time required on a platform is 15 minutes. So, theoretically, you have an extra 10 minutes to resolve a problem. Furthermore, what this image doesn't show, because otherwise the image would be too large to fit in the report, is that HS2 services do not adhere to this exact set-up every hour. HS2 services alternate platforms between the hour. So what you could theoretically end up with is if you have a delay on the first service in, so if we say we had a delay to a service departing at 23, your following service that is supposed to arrive at 33, which gives you a 10-minute window to try and resolve the problem, could theoretically be switched to the alternative platform, assuming that that train had gone, and that would then give you nearly three quarters of an hour to resolve the problem.

240. MR MOULD KC (DfT): Yes. So, here we are debating how you might use the platforms effectively and efficiently to cope with perturbation and you're talking about reducing HS2 dwell times by 10 minutes.

241. MR PALMER: I'm not suggesting that they need to be reduced. I'm saying it is an option available to HS2 as an operator, to help manage their perturbation.

242. MR MOULD KC (DfT): Yes. It's the same point that applies to the operation of the surface stationplatform, isn't it? The operation of that station can use the station capacity that's available in order to cope with perturbation. But the difference is that with the HS2 station, you've got six platforms, so you've got two more platforms available to you to manage perturbation, haven't you?

243. MR PALMER: You do, but you do not have as much additional capacity as you believe you do.

244. MR MOULD KC (DfT): Well, maybe so. But the point is, your proposition inevitably means that the risk or perturbation to the network as a whole, whether it be HS2 or NPR or both, is, to use your words, theoretically significantly greater because you've got two less platforms to work with, haven't you?

245. MR PALMER: The two –

246. MR MOULD KC (DfT): Is that true?

247. MR PALMER: If you're just talking about the physical infrastructure, and you're not talking about the capacity of that infrastructure, then, yes, you're correct.

248. MR MOULD KC (DfT): Yes. And let us imagine that this Committee was persuaded to direct that the secretary of state should instruct HS2 to explore further the case for a four-platform, as opposed to a six-platform, station. It doesn't matter whether it's underground or not, for the purposes of this debate. It's location, geologically, is immaterial, isn't it? It's a question of what its capacity is and what is required in order to manage perturbation, yes?

249. MR PALMER: Yes.

250. MR MOULD KC (DfT): Right. Let us suppose that the Committee was minded to make that direction. The secretary of state would clearly want those advising him, HS2 Ltd and their suppliers, to consider whether four platforms provided the resilience that was required at this stage in planning, to enable them to reduce the number of platforms below six. That would be a relevant question for HS2, for the secretary of state to ask HS2 to consider, wouldn't it?

251. MR PALMER: It would be, yes.

252. MR MOULD KC (DfT): Yes. And HS2 has considered that question, hasn't it?

253. MR PALMER: As far as I'm aware, yes.

254. MR MOULD KC (DfT): And it's considered view is that it cannot advise the secretary of state sensibly that in order resiliently to serve the needs of HS2 and Northern Powerhouse Rail, as envisaged under the IRP, cannot advise that those needs can be served resiliently with less than six platforms at Manchester Piccadilly. You're aware of that, aren't you?

255. MR PALMER: I'm aware that that is the recommendation that they've put forward. I'm not aware of the requirements they've used to come to that recommendation and I do not know the scenarios that they've used to test to be able to deliver that recommendation.

256. MR MOULD KC (DfT): Well, until your evidence came to light in April of this year, that was the common position of both Manchester City Council's technical advisers, Bechtel, Mr Richard George who carried out the independent review, as well as HS2, wasn't it? Because each of those three parties who reviewed the position in 2018/2019, proceeded on the basis that the only alternative to the surface station was a six-platform underground station.

257. MR PALMER: That is the conclusion they've drawn. I was not involved in the production of any of those reports.

258. MR MOULD KC (DfT): No, you weren't. I understand that but that was the conclusion they drew. Because the HS2 position is straightforward, isn't it, as you understand it? Effectively, the reason why HS2 considers that in the event that we were to move to a four-platform Piccadilly station we would need to make provision for a turnback facility is not simply to accommodate through-running HS2 services. It's that effectively you're building a station in two locations. It's a six-platform station in two locations, isn't it? You've got four platforms at Piccadilly and then the two further platforms that you require in order to manage perturbation are under the turnback facility.

259. MR PALMER: This is where you and I will have a professional difference of opinion, that you believe those sidings are required to manage perturbation and I do not believe that they are required to manage perturbation.

260. MR MOULD KC (DfT): Just before we leave this point, can I just ask you to turn to one of our slides, just to illustrate the position. It's P418(24). You've seen this slide, haven't you?

261. MR PALMER: I've seen this slide, yes.

262. MR MOULD KC (DfT): And you've seen it illustrates the point because, as we can see from what is said, the need for turnback sidings to be constructed with a four-platform station is readily illustrated. The train using the four-platform station could be delayed for any number of reasons, such as a door fault, delays in boarding passengers, British Transport Police incident etc. For this example, assume a Manchester to London service had a delayed departure, train circled in red on the image below. So say that's

your platform 3.

263. MR PALMER: Okay.

264. MR MOULD KC (DfT): And we can see that the next driving train, HS2 train, cannot use that platform as scheduled. That's not an unrealistic scenario, is it?

265. MR PALMER: No.

266. MR MOULD KC (DfT): Thank you. That train would therefore have to be accommodated on one of the nominal two NPR platforms. All subsequent NPR trains would then have only platform in both directions until the next HS2 service was able to depart, leading to delays for both HS2 and NPR and rapid increase in perturbation. That series of progressive events is a realistic scenario that could occur at any time in the ordinary operation of the network, isn't it?

267. MR PALMER: It is and it could occur anywhere on the network.

268. MR MOULD KC (DfT): Yes.

269. MR PALMER: And the frequency that it would occur is not sufficient to warrant the provision of the additional turnback facility. But further to this, I'll pick up on this capacity question. You indicate that the next service in is an HS2 service.

270. MR MOULD KC (DfT): This example, yes.

271. MR PALMER: This example. So that service has 20 minutes between the service leaving the platform, potentially before the next HS2 service comes in. So what you're suggesting to me is that the fault that has been developed is of such a nature that it cannot be fixed for over half an hour. At that point in time, knowing that there was a problem, I would expect the operator to have put in place contingency plans to mitigate the issue that you put in front of me.

272. Furthermore, as we said earlier, HS2's rolling stock specifications specifically states that the train should be able to move, regardless of a failure in any of its major systems, as long as it can draw power from the overheads. So if you have a situation here where you have a train in the platform that has some form of delay, I would expect controls, knowing that there was a problem, to have de-trained everybody off that

service long before the next HS2 train comes in and that service be sent to the rolling stock depot at Crewe.

273. MR MOULD KC (DfT): I see. So, your advice to the Select Committee then is that the Select Committee can complacently recommend to the Secretary of State that the sort of perturbation and impact on high speed services that is shared on this plan is not something that you say couldn't happen. You say it could happen.

274. MR PALMER: I agree, it could happen.

275. MR MOULD KC (DfT): That nevertheless, that that's something that can be confidently, effectively accepted as a risk. It can be accepted as a risk and it's not, in itself, something that adds any weight to the case for providing six instead of four platforms.

276. MR PALMER: It is a risk. I will accept that it is a risk. I believe as a risk, it does not justify the spending of £1.3 billion and the provision of additional facilities but we've agreed that that's my position. It differs from yours.

277. MR MOULD KC (DfT): But it doesn't cause any doubt in – I'm so sorry. Do carry on.

278. MR PALMER: What I would also say is that in this – so my technical or my expert view is that the scenario that you've put here, the secretary of state could have received advice, which suggests that an alternative facility with a realistic cost that would need to be determined and would need to be submitted, may be an acceptable alternative to the option of running this to – to allowing the railway operational staff to manage the railway as best they see fit. What I would say here though, and this is an argument that you have within the slide and in subsequent slides, is that the capacity that is available means that you would not be able to run a significant NPR service.

279. Now, I've done the calculation and on the surface station with the five-minute reversal time and the three-minute platform re-occupation time, your stated assumptions, the maximum number of services a single platform can accommodate in terms of through NPR services, is seven, utilising 100% of the available capacity of the platform. Now, in the example that you show here, that you have two sets of NPR

services operating through the same platform in the same way, utilising the platform sharing capability, which is intrinsic in both designs, you can still run six NPR services in both directions through that one platform. Now, admittedly, six is less than seven but you can still run a significant proportion of the NPR service.

280. MR MOULD KC (DfT): This is what happens when one is indulgent to the witness. They run on and one so I'm going to come in and ask you another question now. Thank you. The predicate for that answer was the NPR services dwelling for, I think you said, five minutes.

281. MR PALMER: The NPR services on the surface for five minutes. In the underground station, we have assumed that they dwell for three.

282. MR MOULD KC (DfT): Yes. Well, we know, don't we, on the evidence that we saw last week, which reflects your own analysis, that both scenario 2 and scenario 3 work on the premise that the NPR services have a dwell time of eight minutes.

283. MR PALMER: On the surface they have a dwell time of eight minutes.

284. MR MOULD KC (DfT): Yes, exactly. Did I not put that to you just now? I'm so sorry. That's what I meant.

285. MR PALMER: That's the maximum that the station could accommodate on the surface.

286. MR MOULD KC (DfT): Yes, yes. And you're satisfied that that is a sensible planning assumption?

287. MR PALMER: It is, yes.

288. MR MOULD KC (DfT): Thank you, right. So we're back to the same point, aren't we, the overarching context, that we are debating actually on this issue of turnback etc, we're debating a scenario, which doesn't need to be debated unless you demand that whatever station you provide is able to accommodate station operations beyond 11 trains per hour.

289. MR PALMER: Yes.

290. MR MOULD KC (DfT): Right. And you said to me, 'I can't see the justification for spending the' --

291. MR PALMER: £1.3 billion

292. MR MOULD KC (DfT): - 'that comes in with the turnback'. The same question might be asked of you, given that that is the situation. What on earth is the justification for spending, at the very least, an additional £1.734 billion in order to put a station underground, when the station on the surface which cost £1.734 billion less can do the same job?

293. MR PALMER: Because spending the extra money underground, taking the station underground, improves, as Mr Cameron said as part of his opening statement, delivers a significant amount of additional benefits, over and above the costs of providing that underground station and unlocks the ability to accommodate changes in the railway going forward, which you've admitted your station does not.

294. MR MOULD KC (DfT): I haven't admitted anything. The question of growth, as I understand it, is a reference to the argument that going underground unlocks a degree of additional job creation opportunities through redevelopment, which is outside the scope of your evidence, isn't it?

295. MR PALMER: Correct.

296. MR MOULD KC (DfT): Yes. I'm dealing with the question of the station operations because I'm assuming that, logically, the starting point for this debate is whether the petitioners are able to demonstrate to the Committee that there is a clear operational disadvantage in the overground station, which the underground station is able to remedy, yes?

297. MR PALMER: Yes.

298. MR MOULD KC (DfT): And as I understood it, the case that you're making is that that clear operational advantage is the ability to accommodate the levels of train operations that are implied by running 14 trains per hour through the station.

299. MR PALMER: That is not the only example.

300. MR MOULD KC (DfT): What are the others?

301. MR PALMER: As we discussed previously, in terms of the ability of the station to accommodate delay being imported from the wider classic rail network, your own evidence that has been provided to us says that if on the surface an NPR service either arrives or accrues more than two minutes of delay in the platform, that the performance of the wider NPR and HS2 network will rapidly deteriorate. You do not have that problem underground and that is evidenced by the fact as part of our stress testing that the surface station, the performance of the surface station under our stress testing, dropped to a level that was what we would suggest is unacceptably low, i.e. below 75% of services arriving with 30 seconds, three hours before the underground through station reached the same level.

302. MR MOULD KC (DfT): Well, I've asked you questions about the ability of four platforms to provide the sort of resilience that is required at this planning stage in the process and the slide is on the screen in front of you. It seems to me that we're effectively approaching this from the position of almost trying to kill each other off and I think I'm going to stop there in that respect. I've put my point to you and I'll ask my witness in due course to respond on those points.

303. CHAIR: Thank you.

304. MR MOULD KC (DfT): Thank you very much.

305. CHAIR: Thank you, Mr Mould. I just have a follow-up and Grahame does, I think. I just want to be clear on this then. The underground station proposal only works above 11 trains per hour if there is a stop somewhere else or the turnback facility. Is that correct?

306. MR PALMER: So, based on the evidence submitted, the underground station will deliver the 11 trains per hour and if we wanted to achieve more than that, based on the evidence submitted, we would look to run the HS2 services through, to provide additional benefits, but acknowledging that this is information that has only been made available to us as part of the statement of common ground process, that there also opportunities using the design of the platforms for NPR services, which those opportunities exist for HS2 infrastructure, to run additional through services that way.

307. CHAIR: I just want to be really clear on this. I'm not sure I – so I understand. To get beyond 11, the train cannot idle/dwell on the platform for the time proposed. To get beyond 11, underground or above, the HS2 services have to go somewhere else, to either a turnback facility or another station. Is that correct?

308. MR PALMER: If you assume that you can only have one train on a platform at any given time, that is correct.

309. CHAIR: Right. And you are assuming that though in your own proposals.

310. MR PALMER: And in that evidence, yes.

311. CHAIR: Thank you. Grahame?

312. MR MORRIS: It's okay. I'm going to wait until the promoter's case. I've made a note of it.

313. CHAIR: Alright, thank you. Thanks, Mr Palmer and Mr Cameron. You're ready for your next witness, are you?

314. MR CAMERON KC: I'm conscious of time, sir, but there are two points I'd like to take up in re-examination.

315. MR CAMERON KC: You were asked by the Chairman just now and by Mr Mould before, and that's what I'm re-examining on, about whether the underground through station can accommodate more than 11 and you were asked about running through, and you said, 'That is the position set out in the report. Those assumptions have changed since HS2 signed the statement of common ground'. Now, I want to just explore with you what you meant by that and can you have in front of you, your slide 20, please? Do you have slide 20?

316. MR PALMER: It's not come up on the screen.

317. MR CAMERON KC: Yes, and no doubt it will in a moment. So, what did you mean by, 'those assumptions had changed'?

318. MR PALMER: So, all of our original assumptions, until relatively recently, assumed that one train occupies one platform at any given moment in time.

319. MR CAMERON KC: Yes.

320. MR PALMER: It's a very conservative assumption. One train occupies one platform and you cannot have a second train in the same platform at the same time.

321. MR CAMERON KC: And what happens if you can have more than one train? And if we look on the right-hand side, we see, 'with platform sharing'. We've got underground. We've got a row, which has three, the penultimate row –

322. MR PALMER: Yes.

323. MR CAMERON KC: – three terminators. How many do you get through? So, three London terminators, which Mr Mould asked you about.

324. MR PALMER: Yes.

325. MR CAMERON KC: How many can you get through on the other platforms?

326. MR PALMER: So, with platform sharing, you can accommodate 10 through services per hour, retaining three London terminating services. So, a maximum of 13 services, not the 11 that is only capable with the surface station.

327. MR CAMERON KC: And just so that it's fair, is that the case when you have platform sharing on the surface station?

328. MR PALMER: No.

329. MR CAMERON KC: What happens there?

330. MR PALMER: So, because the platforms on the surface station are a terminus platform, and I alluded to this earlier, you cannot have Train A at one end of the platform and Train B at the other end of the platform. Train A cannot depart after Train B has left because they're being blocked whereas, underground, as soon as Train A is finished, Train A can leave and B can then leave when it is ready. There is no operational benefit on the surface, other than managing a very specific set of perturbation scenarios, for platform sharing.

331. MR CAMERON KC: Thank you. One other point. I'm conscious of the time. You were asked about the difference between six platforms and four and you were

asked whether you had as much capacity with four as with six and you said, 'If you're just talking about physical infrastructure, not capacity, then it's true'. What did you mean by, 'physical infrastructure, not capacity'?

332. MR PALMER: So, if all you are talking about is a platform face, and the track next to it, and everything is equal, then six platforms will have more capacity than four platforms. However, in this example, where the surface station operates from a reversing point of view, when you add the minimum five-minute reversal time to the three-minute platform reoccupation value, and you maximise the number of services that you can operate, and assume that all those services run through, those three platforms on the surface have a capacity of 21 services per hour but the two platforms underground, assuming either a two-minute dwell, which is an HS2 assumption for through services, and a three-minute platform re-occupation value, which is also an HS2 assumption, that would give you a total of five. 12 fives are sixty; two 12s are 24; 24 is greater than 21; and if you applied platform sharing and you used the three-minute dwell time and the three-minute platform re-occupation value, you still gain 24 services per hour across two platforms.

333. MR CAMERON KC: Thank you. I've no other questions for you. I'm very conscious of the time and I'm going to hand over to Mr Byass who's going to call the next witness.

334. CHAIR: Thank you, Mr Byass?

335. MR BYASS: Thank you, sir. So that's Mr Hindle, Mr David Hindle.

336. CHAIR: Right, Mr Hindle. Thank you to Mr Palmer for joining us again. You had the long weekend. I apologise.

337. MR PALMER: Thank you.

338. MR CAMERON KC: Sir, I am conscious of the time and we are doing our best to speed along as fast as we can but on behalf of the Manchester Authorities, we are anxious that you hear our evidence.

339. CHAIR: Okay, thank you.

### **Evidence of Mr Hindle**

340. MR BYASS: Thank you, sir. So if we could start on Exhibit A66(1) and Mr Hindle, what is set out here is your experience; it's a short summary of admittedly extensive experience, but in short, to introduce you to the Committee, you're a mining and tunnelling engineer with experience in major mining and tunnelling projects on four continents, is that a fair pithy summary?

341. MR HINDLE: First of all, good evening. Yes, that's true. I've been in the industry since the early 1970s.

342. MR BYASS: And then if we could go to A66(3), please. And just to orientate ourselves, A66(3), we've seen this image, or something very similar to it in Mr Lax's slides already. We can see from there that the purple line shows the station box and then running tunnels from HS2 option B1, the dotted red line is the Act limits, the blue line shows the extent of the GM Partners' indicative scheme fitting within the Act limits. We can see the Network Rail station not indicated, but above ground next to it; is that right?

343. MR HINDLE: That's correct, yes. It also shows the potential perturbation crossover and the ventilation shaft at Ardwick are also within the Act limits.

344. MR BYASS: And so far as you understand, is there any dispute with HS2 that an underground through station, an underground station of this kind, can feasibly be provided; is that in dispute?

345. MR HINDLE: So far as I'm aware, no.

346. MR BYASS: And the disputes, such as there are relating to construction, boil down as – I understand it – to time and cost, and I want to explore just a few of the reasons for that. Can we go to A66(6), please, first of all? And what you do on A66(6) and (7) is start to introduce information about the ground conditions in Manchester. Can I ask you this, please? What's your view of the likely ground conditions for the station box and HS2 running tunnels?

347. MR HINDLE: Yes. In central Manchester, the surface deposits across the entire city centre are glacial. They comprise mainly stiff glacial clays with interbedded

gravels. Overlying to the southeast of the station by thin deposits of alluvium from the river Medlock. Below that, we have the solid geology, the bedrock geology, which is entirely Sherwood sandstone, a particular horizon of the Sherwood sandstone called the Chester formation, Chester conglomerate. That particular unit of rock extends right across the north of England from Liverpool all the way to Nottingham.

348. MR BYASS: What is your experience in construction tunnelling, cavern construction, ground conditions akin to what we have her?

349. MR HINDLE: My experience is mainly in Liverpool where there are very large caverns in that city, in the centre of the city, built in Victorian times. The tunnelling conditions generally in that material are exceptionally good. We're very lucky in the north of England, actually, to have this type of ground; you do not see it in the south of England, in London for instance. This is a moderately strong to moderately weak rock but it's a very, very competent rock and it's very well suited to deep excavations and tunnelling.

350. MR BYASS: If we go to your exhibit A66(18), please. This is entitled, 'Mined tunnel and cavern construction in Sherwood sandstone', this is the Liverpool example.

351. MR HINDLE: Yes. This particular example I worked on very recently. It's the approach into Liverpool Central station, it's an underground approach. It was built in the late 19<sup>th</sup> century and it is essentially unlined apart from the roof which has got a brick lining. The side walls which stand vertically, are completely unsupported from the day it was built.

352. It's only now after 100 years that some attention has been given to the brick lining, simply because the brick itself is deteriorating, not particularly the rock, the brick is deteriorating and Network Rail were worried about pieces falling out of the brickwork and hitting the trains below. So, the objective there was to strengthen the brickwork.

353. MR BYASS: You made a point about the vertical sides there; if we could go back to your A66(8), please, a more local example of the Sherwood sandstone. What significance do you draw from this in relation to the ability to excavate in a vertical way?

354. MR HINDLE: This is not very far from Manchester centre. It's on the M60 in Stockport. There are a series of vertical and near vertical cuttings alongside the M60. Some of them date back to an old railway that was there. These cuttings are virtually unsupported or totally unsupported. They are very high, they require virtually no maintenance whatsoever. It is exactly the same formation, the Chester formation of the Sherwood sandstone group that occurs at Piccadilly station.

355. MR BYASS: Now you provided a report the Sherwood sandstone and the construction and tunnelling opportunities and in response, there was a review prepared by HS2 which is document P425. If we go to P425(15), please and pick it up from the top of that page.

356. CHAIR: Mr Byass, I'll just be clear on this: is there a disagreement between yourselves and HS2 about the geology here or about the viability of constructing a station underground here?

357. MR BYASS: There is and the difference goes to the level of confidence in the ground formations, the rock formations, and that's exactly the point I'm coming onto.

358. MR MOULD KC (DfT): There isn't actually. There might be an issue about what assumptions you can make about risk of hydrogeology and so forth and whether one needs to make some allowance in terms of contingency, but we're not saying you couldn't build the station because of the geology.

359. MR BYASS: No. The points go to time and cost.

360. CHAIR: Right.

361. MR BYASS: And points are being made against us in terms of time and cost based on the assumptions you can make in relation to the ground conditions and those are the points that I'm going to explore with Mr Hindle.

362. CHAIR: No, I just want to be clear where we were heading on this...

363. MR BYASS: No.

364. CHAIR: So I appreciate it.

365. MR BYASS: Yes. I understand the question, sir, and it's helpful what Mr Mould has said as well, but it's not that there's a difference about ground conditions, it's about how you can utilise those ground conditions.

366. CHAIR: Right.

367. MR BYASS: And so the top of page 425(15), it's the point that GM Partners have made which is in terms of programme and costs. One of the most significant opportunities relates to tunnelling and excavation in the sandstone geology. HS2 doesn't agree that there are opportunities that would materially affect the overall duration of the construction programme; that's the point.

368. Then it goes on at 3.3.2, 'The construction methodologies and programme used for HS2 are optimised based on logic and precedents', and the precedents referred to are Crossrail and Old Oak Common, so precedents we know from the southeast.

369. So Mr Hindle, any comment from you, please first of all, on the significance of the construction methodologies and programme being based on precedents in the southeast?

370. MR HINDLE: Well, the basal geology, the bedrock geology in London around Crossrail and Old Oak Common and Jubilee Line and Thames Tideway etc, are completely different from that in Manchester.

371. Here in London, Westminster station, right next to us, was constructed entirely in London clay overlain by Thames gravels. These are regarded as what are called soft ground in tunnelling, soft ground, and they require a particular technique which has been developed – particularly over the last 20 or 30 years. It can be summed up as the sprayed concrete lining method, the SCL method, which is based on an older Austrian method call the new Austrian tunnelling method but that's just historical.

372. The difference is that at Manchester, we're essentially dealing with rock. It may not be the strongest rock but it is rock and it's very massive rock. It's particularly as proven in Liverpool and in the cuttings at Stockport, in Nottingham large tunnels there, and also right in the centre of Manchester, some large tunnel excavations have been made in this rock which have required little or no support whatsoever and have lasted a long, long time.

373. MR BYASS: If you were to apply methodologies that are used in the southeast in different ground conditions to the tunnelling construction in Manchester for what's proposed here, what would the outcome be?

374. MR HINDLE: Well, you could do it. You could use the same methodology but it would be hugely over conservative. Here we don't need to excavate in ovoid shapes as they do in London to even the geological stress on the tunnel. We don't need such thick linings and we don't necessarily need the degree of waterproofing either, although we do need some.

375. MR BYASS: You mention ovoid tunnels; if we could go to A66(19). Where are these images from and why have you included them in your exhibits?

376. MR HINDLE: These images are taken from HS2's information. They're really profiles that you would see in London clay. I recognise them very well because I was involved intimately in developing those particular scenarios.

377. You can see they are very oval shaped. They are not the easiest things to excavate. They have to be excavated in a number of stages, and also, you'll see the lining thicknesses are quite thick. They can be anything up to 600mm, even a metre thick in some instances. So, we're looking at very expensive to construct tunnels and caverns.

378. Whereas in Manchester, we've seen from examples in Liverpool, and also in central Manchester, that much simpler tunnel shapes can be achieved with much less support, much less temporary support, that support that's immediately needed, and support that's permanently needed than you see in London.

379. If Manchester had the same geology as London, I would be advising you that this is the way forward. It's not, so I advise that you approach it from a different perspective.

380. MR BYASS: And just if we test that point in one other way, if we could go to your slide 23 which provides a description of the construction sequence and spoil movements, and this builds up your construction sequence in a number of stages. So stage 1 is establishing the work sites and demolishing the structures, and you can see

they come onto the screen now. Stage 2 involves the commencement of piling and installing the rail head spur.

381. MR HINDLE: Obviously, you have to create a worksite first, you have got to demolish all the properties that need to be removed, Gateway House, for instance. And the first operation would be to create the perimeter walls around the station box and the ventilation shaft at Ardwick. Here it's shown as piling, HS2 propose to use diaphragm walling, there are arguments for both. I think piling wins in the end but that's a technical argument.

382. So that is where we are at. The railhead spur is put in place around about that stage, ready to receive spoil.

383. MR BYASS: And just for the Committee's benefit, what is a diaphragm wall?

384. MR HINDLE: Well, a diaphragm wall is essentially a vertical slab of concrete. If you go to Westminster station, you'll see a diaphragm wall as plain as plain can be. It's what you see behind those vertical and horizontal members in the side walls. You'll see a very, very rough concrete wall and you'll see that they are slightly offset. They're constructed by excavating a slot in the ground, filling it with bentonite – so that's a very dense slurry – and then circulating into that concrete beginning at the bottom with a reinforcement and then displace the bentonite, recycle the bentonite and then when the concrete sets, you go onto the next one and so on.

385. The other method is to pile it and there are two types of piling, one is contiguous piles where the circular piles are bored and just touch each other, but there is a possibility of a gap between them which you deal with later, or secant where you overlap the consecutive piles. So one drills into the next one; one is slightly softer than the one next to it so it's able to drill into it. That way you create a more complete wall. So these three methods of creating a wall.

386. Here I am showing you contiguous piling; it could equally be secant piling. I think that diaphragm walling is probably a little bit over the top.

387. CHAIR: If colleagues agree, I'm just going to intervene here a moment. I think both parties agree that the construction of an underground station is possible, everybody

agrees it will cost more money, there's a dispute over the cost – and we all agree, I believe, that it would take three years longer on the construction; is that correct? That's not disputed, is that, by either party?

388. MR HINDLE: In general, yes, but I think there may be opportunities to accelerate that programme.

389. CHAIR: Right. If so, the reason I intervene at this point is I'm just – how it's constructed is really of no relevance to the Committee, if it can be done and there's an agreement on how it will be done, so I want the Manchester Partners to put their case for why it should be done, so I'm just struggling to understand at the moment – explaining construction methods to us is very interesting; I'm just failing to understand how this is helping your case for why the Committee should direct the Secretary of State to do a certain thing on this. So I'll just let Mr Byass respond to that and then if Mr Mould had a point.

390. I'm just really clear that the evidence you present to us is the one that puts your case in the strongest terms and I'm a bit confused as to where we're heading at the moment on this.

391. MR BYASS: So, there's variations in the amount of cost reductions that the parties suggest could be achieved through – the cost difference that would exist with an underground versus a surface station, and differences in terms of timing. You've had some minimum times and some maximum times. So, the point of exploring the geological points which Mr Hindle is just to illustrate that the estimates in terms of timing and cost can be brought down significantly.

392. CHAIR: Right.

393. MR BYASS: Now, Mr Hindle, just on that point, and just if you could summarise then for the Committee, why it is your view, and you've set it out, that the cost and time of construction of an underground station could be brought down significant. What are the key points that you're seeking to rely on?

394. CHAIR: I did say I would let Mr Mould say something and then I'll come back to Mr Hindle.

395. MR BYASS: Yeah.

396. CHAIR: Sorry to interrupt.

397. MR MOULD KC (DfT): I wondered whether it might be helpful to say that the two aspects of Mr Hindle's evidence which we are interested in are firstly, the length of time that it takes to move from an excavated box to a fitted out station.

398. CHAIR: Right.

399. MR MOULD KC (DfT): Secondly, whether you can start turning an excavated box into a fitted-out station significantly before you have completed excavating the box, and thirdly, should you make some allowance for contingency and risk in terms of the construction process taking longer than your best case, and if so, how long?

400. CHAIR: Okay. I mean, Mr Byass, it's up to you. I'm just trying to be helpful to make sure we –

401. MR BYASS: No, I appreciate that.

402. CHAIR: – you put your strongest case to the Committee before we run out of time. But anyway, proceed, sorry.

403. MR BYASS: So, Mr Hindle, going back to my question then; on those points of time and cost, compared to the position that you've seen HS2 has set out in terms of its assumptions about time and cost, where do you see time and cost savings arising and what's the output of that?

404. MR HINDLE: Well, just looking at the piling to begin with, the HS2 scenario shows the piling extending down below the base of the excavation. This is – particularly with diaphragm walling – this is a very expensive and time consuming process. The rock, in the worst-case scenario, will occur at about a depth of 17m which is well above the base of the excavation. The piling need not go any deeper than that.

405. Below that level, the box can be excavated in the open, just like a cutting. This will significantly shorten the programme and reduce the cost. The main reason being that the box constructed in rock only requires a minimal amount of support, whereas if it's constructed all the way down in soft ground, it'll have to be supported all the way

down.

406. Also, the actual base of the excavation will need to be pretty substantial if it was in soft ground. In rock, there's no point in replacing good rock with concrete, you can make that thinner. So, you have a reduction in the cost of the piling, you have a reduction in the time of the piling, you have a reduction in the fit out because you need less concrete to go in there.

407. The rest of it is mainly to do with tunnelling, but the main issue is how do you move the spoil around the site and out of that site. That is the key constraint on the programme. I think in the piling and excavation can go pretty rapidly, but the choke point is really how quickly you can get rid of the spoil.

408. MR BYASS: And picking up on Mr Mould's three areas of concern; dealing with that spoil removal compared to the issue of how quickly you can excavate a box to fitting out the station, your response on that in relation to the spoil removal?

409. MR HINDLE: That's right. There are ways you can accelerate it; because it's such a very large box, you don't have to excavate the whole lot at once, you do not have to construct the whole lot at once. You can excavate it in part and then begin the internal structures, and even soe of the fitout.

410. Now, we've been looking at trying to finish the Metrolink part of the box early so that Metrolink can be re-established in its new station before the complete station is finished. We've also looked at ways that the Metrolink service can be maintained throughout that, or for the most part of it, rather than having it cut off.

411. CHAIR: With an underground station, not in terms of the overground station?

412. MR HINDLE: In terms of the underground station, yes. So, I'm not suggesting that you excavate the whole thing and then stop and then install everything, no. You would do it in phases. And this project is big enough to do that.

413. MR BYASS: Now, when it comes to – you've taken a view of the ground conditions and their ability to be tunnelled and constructed in – which you've explained in your evidence as well. So on the point of the contingency for risk, if we can go to your slide A66(11), just explain by reference to this your approach to contingency and

risk.

414. MR HINDLE: Well, here we can see in dotted outline, you can see how piling would extend to the base of the excavation and below it, if this was a box constructed in soft ground. The bolder shaped lines on the side there are really the depth to which you'd need to do piling in the very worst case. I believe that the rock head at Piccadilly is higher than that and probably only at about 8m deep, but that has to be proven by ground investigation. But what it does show is that a substantial portion of that box need not be piled.

415. So you can finish the box more quickly, and you can begin the process of installing the interior structures and the fitout particularly in the Metrolink section of the box which is shown there, as early as possible.

416. MR BYASS: Thank you. And then just one other point which is ancillary but related to the ground conditions. An issue that's been raised is the prospect of development over the top of the running tunnels. Can you just give the Committee your view on that, please?

417. MR HINDLE: Yes. It obviously needs to be considered but the running tunnels generally will be at a depth, sufficient – and the running tunnels will be entirely in rock, not soft ground – and they will be at a sufficient depth that there shouldn't be any significant restrictions on development above.

418. If development requires piling, the piling would go through the superficial deposits and just sock it into the bedrock above where the tunnels are. Obviously, you have to take due cognisance of that and just check it, do the due diligence on it, but in terms of serve restrictions on development above, no. I don't think the tunnels would have any significant effect.

419. Large caverns, however, you may well have to take it into consideration. You may look at ways off strengthening those caverns, or you may look at ways of using that space above the cavern for something else, maybe an open area, or a large boulevard or whatever. You could do either. So there maybe restrictions above a cavern. Under the tunnels, I doubt it very much, they're too deep and they're in rock.

420. MR BYASS: Thank you.

421. CHAIR: Directly above the station, yes?

422. MR HINDLE: Above the station, that's a different issue. If you're going to do oversite development on the station, you have to know in advance what you're going to do, and you have to accommodate the foundations of the oversite development in the station box itself.

423. CHAIR: So, when you said 'caverns' versus tunnels, where are the caverns then? Because I understood the cavern to be the –

424. MR HINDLE: There is a possibility that perturbation crossover at Ardwick could be constructed in a cavern. At the moment it's shown as constructed as an open box structure and this is what HS2 are doing at Old Oak Common, for instance, and at Euston. There is a possibility because that cavern will be entirely in rock, even under the worst case conditions, it may be more economical and more advantageous to constructed it in cavern.

425. It will be a large cavern but it'll be no larger, probably, than the crossover cavern on the Channel Tunnel that was used underneath the Channel in poorer ground; that crossover cavern was constructed very successfully. It was about 22m in diameter, that would probably be around about the size of the crossover here.

426. CHAIR: Thank you.

427. MR BYASS: Thank you, sir. Those are my questions

428. CHAIR: Thank you, Mr Byass. Mr Mould?

429. MR MOULD KC (DfT): Thank you. Mr Hindle, I just want to ask you about the assumptions you've made in terms of your programme. If we just look at your presentation at A66(31). You briefly summarised to the Committee, you've identified a 12 stage indicative programme, essentially for the construction of the station, haven't you?

430. MR HINDLE: Yeah, that's correct.

431. MR MOULD KC (DfT): You've indicated fairly that you don't include everything; the note says that you need to allow time for ground investigations, design, land acquisition, utilities, diversions and other enabling works. I worked out by comparing your programme with that which Mr Lax put forward, that your year one, on the basis of Mr Lax's approaches, 2029. You've probably done the same thing yourself, haven't you?

432. MR HINDLE: No, I've simply considered it on year by year. Not on date.

433. MR MOULD KC (DfT): Oh, I see. Right. If we look down to line eight, eight is when you're excavating the station box, isn't it?

434. MR HINDLE: Yes, on that programme, yeah.

435. MR MOULD KC (DfT): And this is on any view going to be a very large box, isn't it?

436. MR HINDLE: It is indeed, yes.

437. MR MOULD KC (DfT): I've been told it's comparable in size to 19 Woolwich station boxes on the Elizabeth Line or 15 Paddington station boxes on the Elizabeth Line; I don't know if you've looked into that yourself?

438. MR HINDLE: No, I wouldn't dispute it. I'm sure somebody's done the sums, yes.

439. MR MOULD KC (DfT): Yes. And whilst I take your point that there is evidence that the geology may be favourable to construction in the sense that it may be very firm, until ground investigations have been carried out, it won't be possible, for example, to understand the degree to which there is a need to cope with water, will it, for example?

440. MR HINDLE: No, that's absolutely right, I couldn't agree with you more.

441. MR MOULD KC (DfT): And the same with contamination? We're underneath a city that's been in place for many, many years, centuries, and we have to allow for the fact that there may be uncertainties over the degree to which contamination has to be addressed.

442. MR HINDLE: It's possible, but water has been abstracted from the same Sherwood sandstone, for instance, for Boddingtons Brewery, and that seems to have gone alright.

443. MR MOULD KC (DfT): Yes. But it's not necessarily only water, is it? There may be other contaminants.

444. MR HINDLE: Oh, indeed, yes. And certainly, in the made ground on the surface, that will need to be examined very carefully.

445. MR MOULD KC (DfT): And there's also the need to consider the risks posed by diverting utilities; you're aware, for example, that there is a very large sewer which runs beneath Travis Street?

446. MR HINDLE: Yeah. There are obviously – there are always utilities and they are always a problem. I would say the diversion of the Medlock river is probably the main issue as well.

447. MR MOULD KC (DfT): Yes. That's a big issue. All of these things will – allowing for these, and we could probably spend a good deal of the time that's available, or not available actually, running through other examples – but the scale of construction here is enormous and the risks associated with it are significant, aren't they?

448. MR HINDLE: Oh, they are indeed.

449. MR MOULD KC (DfT): Yes.

450. MR HINDLE: But I believe that, with further investigations, particularly ground investigations and research, those risks can be brought back to something that is more manageable.

451. MR MOULD KC (DfT): You may be right, and you may be wrong.

452. MR HINDLE: Yes.

453. MR MOULD KC (DfT): But the point is we're at a stage where that work has yet to be done, aren't we?

454. MR HINDLE: We are indeed.

455. MR MOULD KC (DfT): And the question is in trying to get a sense of what is a realistic and prudent allowance for construction, and what follows in relation to the underground station alternatives, whether some degree of allowance should be made for some or all of those risks eventuating? Whether some allowance should be made for the programme to slip, for example, in order to enable those risks to be managed. Is that a fair question, fair point?

456. MR HINDLE: It is a fair point; programmes often slip.

457. MR MOULD KC (DfT): And we're planning at the moment, aren't we, with a relatively high-level amount of knowledge about the sort of things that might be revealed through investigation?

458. MR HINDLE: We are, but I think that our general knowledge about the geology below the superficial in Manchester is pretty good. There is the example of the Guardian underground telephone exchange in the centre of Manchester which is a very large network of some quite large tunnels where the sandstone has been proven to be perfectly sound and adequate.

459. MR MOULD KC (DfT): Quite a lot of water encountered as well.

460. MR HINDLE: There was some water, not a great deal. Although it was the 1950s, they were perfectly able to control that water with pumping.

461. MR MOULD KC (DfT): Where have you allowed for risk and slippage in this programme?

462. MR HINDLE: The programme really looks more at the risk of being able to move the spoil that we think overrides all the other risks. That is the main risk. We know that we have a limitation on the number of lorry movements and the objective of this programme has been to accommodate a programme with the ability to move as much of the spoil by rail and as little by lorry as possible. We see this as being the main risk.

463. MR MOULD KC (DfT): So, you've not made any allowance for the risk of more challenging ground conditions in terms of excavation, the greater difficulties in shifting utilities, all those sort of things – the things and more that I've put to you – made no specific allowance for that in this programme?

464. MR HINDLE: Except that I would say – the answer's no –

465. MR MOULD KC (DfT): Thank you.

466. MR HINDLE: But may I say, the ground itself, the risk can only be reduced, and will be reduced by further investigation.

467. MR MOULD KC (DfT): That depends on what allowance you've made for risk. If you've made no allowance for risk, it maybe the opposite. If you've made a substantial contingency allowance for risk, you've allowed a range of completion dates, then you may very well be right, but you haven't made an allowance for completion –

468. MR HINDLE: The risk I have allowed is for what I perceive to be the biggest risk, the overriding risk, and that is the movement of spoil off this site. This is, as you rightly, say, this is an enormous undertaking. It is going to be the movement – how do you get that material away and out of Manchester? Or, can that material be used in Manchester? And there's a possibility of that also.

469. MR MOULD KC (DfT): Line 11, whilst we're on this, is entitled, 'Commissioning and testing'. The HS2 programmes not only from this station, but for all of the HS2 construction, allows an additional period of time for trial running.

470. MR HINDLE: Yes, I'm sure it does.

471. MR MOULD KC (DfT): Have you allowed for that?

472. MR HINDLE: No.

473. MR MOULD KC (DfT): Right. So we've allowed for an additional year in relation to this schedule.

474. MR HINDLE: I'm looking purely at the issues directly related to construction.

475. MR MOULD KC (DfT): If we accept HS2's additional year, that would extend your programme out to year 10.

476. MR HINDLE: I don't know, it may do.

477. MR MOULD KC (DfT): Alright. Can we then come back to compare lines eight

and 10? Eight is the excavation of the station box itself, isn't it?

478. MR HINDLE: Yes.

479. MR MOULD KC (DfT): And 10 is the internal fitout – 10 is converting an empty box in the ground, very large empty box in the ground, into a station, a fitted-out station which is available for railway operations, isn't it?

480. MR HINDLE: Yes.

481. Mr MOULD KC (DfT): That's what 10 is –

482. MR HINDLE: Well, it's to get the internal structures all ready for railway –

483. MR MOULD KC (DfT): And fitted out.

484. MR HINDLE: Well, with escalators and so on –

485. MR MOULD KC (DfT): Bear with me, it says, 10 says, 'Construct all internal structures and fitout'.

486. MR HINDLE: Yeah.

487. MR MOULD KC (DfT): And you've allowed for 2.75 years for that, and you've allowed for over half of that time to be done whilst the station box itself is still being excavated, so whilst it's still be mined. Is that a prudent assumption to make for planning purposes, Mr Hindle?

488. MR HINDLE: It's an assumption based on particularly the Metrolink section of the box which is a good quarter of the box. The objective being to complete that section of the box as early as possible in the programme so that Metrolink can be re-established. So that's where that comes from, mainly. But obviously, we may be able to accelerate it further forward, I don't know.

489. MR MOULD KC (DfT): Well, we have assumed that it would take two years to deal with the internal structure and two years to fit out the station. Are those prudent assumptions to make?

490. MR HINDLE: I wouldn't know, they may well be.

491. MR MOULD KC (DfT): Right. And we've assumed that the majority of those works, the majority of that four years, will take place after the station box has been excavated; is that a fair assumption to make, for planning purposes?

492. MR HINDLE: No, I think some of it can be done whilst – sorry, it's such a large box this. You can finish a goodly portion of it and begin the fitout early before you go onto the next one. This is a huge box.

493. MR MOULD KC (DfT): So if we were – as I say, we've assumed four years in total for line 10, you've assumed 2.75. If we were to follow our assumption which you haven't quarrelled with, against yours, that would mean that the duration of your programme would extend by – allowing for the trialling as well – would extend by another three plus years, wouldn't it?

494. MR HINDLE: It would if we couldn't bring any further acceleration to the front end of this programme. As I said, the main choke point is the movement of spoil, and as much of it needs to be moved underground, that is from the Piccadilly site to the Ardwick site, as possible. We don't want spoil crossing the Mancunian Way and that junction with Fairfield Street, it's a very, very congested junction.

495. The objective of this programme is to finish elements of the box sufficient – and the running tunnels between the box and Ardwick, sufficient so that the main bulk of the spoil from the station box can travel underground and underneath the Mancunian Way to the Ardwick shaft and to the railhead and be disposed of.

496. MR MOULD KC (DfT): Yeah, and you're – just to be clear, let's not misunderstand the significance of that, your position is that you're seeking to manage the rate at which material is delivered from the box itself to disposal by rail at Ardwick so as to avoid generating significant additional HGV movements in central Manchester?

497. MR HINDLE: That was the objective I was being given, yes.

498. MR MOULD KC (DfT): Exactly. So, this isn't, as it were, a matter of choice, this is – the reason why you've built that into this programme is because your clients do not wish to be accused of promoting a scheme which generates thousands and thousands of additional HGV movements in central Manchester.

499. MR HINDLE: I believe that they're quite right in that assumption –

500. MR MOULD KC (DfT): In other words, yes, I'm right and you agree.

501. MR HINDLE: I believe that their assumption is a good one. I never say that I'm right or wrong, there's never a right or wrong answer –

502. MR MOULD KC (DfT): I'd be grateful if you did.

503. MR HINDLE: There's never a right or wrong answer in these things. The objective is important. The objective is the movement of spoil with the least disturbance to the city as possible. Now, if we can accelerate, or we can increase that capacity, and it's a very restricted capacity at the moment, it's 1,800m<sup>3</sup> a day, if that can be increased significantly, then that would accelerate this programme.

504. MR MOULD KC (DfT): Yes, if, it would. Again, that's a risk that if it runs the right way, so far as your case is concerned, might help you to abbreviate the programme, you would say?

505. MR HINDLE: Indeed, but that's why I'm showing this as high-risk programme.

506. MR MOULD KC (DfT): Well, it's it right, as I say, we're at an early planning stage here.

507. MR HINDLE: We are.

508. MR MOULD KC (DfT): And in judging the degree to which allowance should be made for risk or slippage, or the opportunities that can made for abbreviating a programme, we need to bear in mind that we are working on the basis of relatively limited knowledge, aren't we?

509. MR HINDLE: We are indeed.

510. MR MOULD KC (DfT): Thank you. Two more questions; just to illustrate the point about making a realistic allowance for internal structures and fit out. We've counted off 54 escalators on the plan submitted by Greater Manchester to illustrate their station concept. Our judgement is that we should allow a minimum of two years in which to construct 54 escalators. Is that a fair assumption to make?

511. MR HINDLE: Well, it would be if this was a constrained site. I mean this is a very big and open site. If it was in the centre of London, and yeah, it's difficult to install escalators down tight tubes and into places like Westminster or London Bridge –

512. MR MOULD KC (DfT): This is an unconstrained site.

513. MR HINDLE: Here we've got a very unconstrained site, it's big.

514. MR MOULD KC (DfT): It's got a Network Rail station right next to it.

515. MR HINDLE: Yes, but we've demolished Gateway House, there is a good access from both sides from, from the Piccadilly side and the Ardwick side.

516. MR MOULD KC (DfT): Have you managed the installation of 54 escalators into a station –

517. MR HINDLE: I don't think anybody has.

518. MR MOULD KC (DfT): No, quite. So, we need to be realistic about the time we should allow for that, shouldn't we?

519. MR HINDLE: Well, I'm trying to be realistic.

520. MR MOULD KC (DfT): Thank you. And we also estimate that your plans assume the installation of 31 lifts.

521. MR HINDLE: Mm.

522. MR MOULD KC (DfT): Two years for that, a sensible and prudent allowance?

523. MR HINDLE: Well, China, everybody talks about China now. I've been to projects in these countries where that sort of scale of activity is done and it is possible. The big advantage of this particular site is that it's very, very open. There's a lot of ways in and a lot of access. It's not a particularly constrained site.

524. CHAIR: Just jumping in there. Maybe don't pray China in aid in terms of health and safety and construction.

525. MR HINDLE: Well, I was there as a health and safety advisor. I might have been

fighting a losing battle at some front.

526. CHAIR: That's brilliant.

527. MR MOULD KC (DfT): It's a pretty modest proposition to you, isn't it? I mean, the only other point on those two things is you clearly can't contemplate installing escalators or lifts whilst you're still carrying out civil construction works, can you?

528. MR HINDLE: Well –

529. MR MOULD KC (DfT): You need a clean environment for that.

530. MR HINDLE: You would complete the civil and construction works in an area, then you install the lifts. It's such a big job that even taken in pieces, these are big contracts and big orders.

531. CHAIR: The point I was trying to intervene on, Mr Mould, was not necessarily China's record on health and safety which Mr Hindle turns out partly liable but it was more about where are we terms of the disagreement here? So, your line of questioning is clearly going to the – it was three-year I think the petitioners were proposing would be the period required to extend this Bill to do the underground stations was three years, wasn't it?

532. MR CAMERON KC: It's not just the Bill but the total period.

533. CHAIR: The whole –

534. MR CAMERON KC: Yes.

535. CHAIR: So the opening of HS2 is delayed three years for the underground station. I appreciate where you're going with your questions, Mr Mould. I'm just wondering what the endpoint is into what is your summation of how much you think is a reasonable estimate from the promoter's side for what you think this station underground would add to the programme.

536. MR MOULD KC (DfT): 4.5 to 8.5 years.

537. CHAIR: Four and a half to eight and a half years.

538. MR MOULD KC (DfT): Yes.

539. CHAIR: Fine.

540. MR MOULD KC (DfT): With an allowance for a realistic period for internal structures and fit, a year for trialling, a realistic period for bringing forward the design for the station –

541. CHAIR: No, no, I understand.

542. MR MOULD KC (DfT): – in the context in this House, and an overall allowance for risk.

543. CHAIR: Okay. So that's the disagreement here, and I don't think there's really any need to pursue this any further on this point. The three years from the petitioner to the four and a half to eight and a half from the promoter is, I think, well understood here, and none of us sitting on this Committee are able to judge whether 54 escalators can be installed in Manchester a particular time.

544. But I think the point you made is important, but I just think I'm conscious of time. So did you have any more questions for Mr Hindle?

545. MR MOULD KC (DfT): It's astonishing when one arrives at the same conclusion. I had in fact asked my final question.

546. CHAIR: All of that was unnecessary on my part, so the only person delaying proceedings is me.

547. MR MOULD KC (DfT): That wasn't why I said that at all.

548. CHAIR: No, they all have noted it.

549. MR MOULD KC (DfT): It's true in my case.

550. CHAIR: I've noted it though.

551. MR MOULD KC (DfT): First time ever but it is true on this particular occasion.

552. CHAIR: Okay, Mr Byass.

553. MR BYASS: Just one point.

554. CHAIR: Yes.

555. MR BYASS: I'm conscious of time as well. You explained that, when forming your judgment about the high level construction programme you set out, that your principal concern in terms of risk was spoil removal.

556. MR HINDLE: Spoil movement and spoil disposal.

557. MR BYASS: Just as a master of fairness, what, if any, further opportunities do you see for your construction programme to be accelerated, either having regard to spoil removal or having regard to any of the other matters towards the front end of your programme?

558. MR HINDLE: Well, it may be that not all of the spoil needs to be removed from Manchester. One of the interesting properties of Sherwood sandstone is that it has been mined extensively for construction materials; so we have a very large development site down at Ardwick. Obviously, a lot of this spoil would be stockpiled at Ardwick anyway, all ready to go on the trains, but there's also sufficient room for that material to be processed and reused in the development itself.

559. The Sherwood sandstone would break into, as it's being mined and excavated, it would naturally degrade into a very, very suitable building sand and fine gravel which would require some washing but not a great deal, some grading and separation. But it could be used for a building material. Obviously, there has to be ground investigations and trials done to do this, but it could well be a solution.

560. There are also other opportunities for moving the spoil out of Manchester by rail. It's at a very early stage yet but there is actually an aggregate plant nearby where they ship aggregates in which means they must be shipping empty trains out. So it's very early stages. It's not in my evidence, so I apologise for that, but it's only recently come to light.

561. These are our opportunities that we have plenty of time to look at and these are all opportunities that that could lead to reducing risk and accelerating the programme. I'm not saying that we will be able to take out all of that overrun and I'm not saying that

we'll take out all of the risk. There will be residual risk, the opportunity is to minimise that risk and reduce the programme as much as humanly possible in the time between now and construction.

562. CHAIR: I think the argument is understood. Anything else, Mr Byass?

563. MR BYASS: No, thank you, sir.

564. CHAIR: Mr Hindle, thank you very much. I've enjoyed your evidence. Thank you very much and again, it's on a very important point so we do appreciate your time with us today.

565. MR HINDLE: Thank you, Mr Chairman, very much. Thank you.

566. CHAIR: Back to Mr Cameron. Before we do, I just want to be clear, given the additional information that was provided; on the petitioners' proposed cost, where are we at? Just from your first day of evidence to where we are now? What is your contention on what you believe this additional cost of the station would be now, given we've had the agreement with the car park?

567. I'm trying to really get into my head the total of what your – what the petitioners are proposing would be the full cost of the underground station.

568. MR CAMERON KC: There's a range, sir.

569. CHAIR: Right.

570. MR CAMERON KC: I haven't got that in front of me at the moment.

571. CHAIR: That's fine.

572. MR CAMERON KC: But Mr Mould's kindly good to give it to me but it's on there.

573. CHAIR: This is now taking into account the issue around car parking and the coaching stock sidings that you both have agreed, haven't you?

574. MR CAMERON KC: We have on car parking. That is the 75, but of course the figures that we have, you have to then add on contingency and services and so on.

575. CHAIR: Sure, sure.

576. MR CAMERON KC: The main points are still: do you need a turnback or not?

577. CHAIR: It's still within the presented costings you provided on the first day?

578. MR CAMERON KC: That's right.

579. CHAIR: Okay. I wasn't clear.

580. MR CAMERON KC: We've narrow it down because it's now, as Mr Mould made plain earlier, about omissions, so it's a hopefully relatively narrow point to determine; have we left things out that we shouldn't have done?

581. CHAIR: Okay.

582. MR CAMERON KC: Two things.

583. CHAIR: Right, okay. Thank you. Sorry, I just wanted to clear that in my head before we moved on.

584. MR CAMERON KC: Mr Lonsdale next, please, sir.

585. CHAIR: Mr Lonsdale. Thank you again, Mr Hindle. So Mr Lonsdale. If everyone's comfortable and no one's desperate for a comfort break, we'll just carry on then.

### **Evidence of Mr Lonsdale**

586. MR CAMERON KC: Thank you, sir. Mr Lonsdale's evidence is in a separate pack, I think it was A81. So we're going to A81. Mr Lonsdale, just so that the Committee know why you're here, you work for a firm called Bennetts who have been involved in master planning in this part of Manchester, is that right?

587. MR LONSDALE: Yeah, that's right.

588. MR CAMERON KC: Was it you or your firm who were responsible for calculating the difference in land area that you achieve if you go – that's developable land area – that you achieve by going underground rather than going on the surface?

589. MR LONSDALE: Yes, that was us.

590. MR CAMERON KC: You say 'us', was it you?

591. MR LONSDALE: Yes, I was involved in the process and it was Bennetts Associates, architects.

592. MR CAMERON KC: Good. So can we go to slide 4 please? What I'd like you to explain because there is a dispute between the parties on this, how you went about, the approach you took, to determining the different amount of land available between the surface turnback and the underground through options. How did you do the exercise?

593. MR LONSDALE: Our focus was entirely on the difference between the surface turnback and the underground and that is by placing the station surface infrastructure underground, and that frees up development land for development. Then on that freed-up lands that can be used for homes, workplace, public realm instead of permanent rail infrastructure.

594. Just to say what we mean by 'public realm', that's public realm streets, roadways, tram stops, pavements, parks, plazas. It's all the stuff between the buildings that enables that high-density development to happen. And by 'permanent rail infrastructure' we mean the permanent land that's required to deliver the station. So this is station footprint, it's the viaducts, it's the tunnel portals.

595. MR CAMERON KC: You work out the difference in the amount of land and then you work out how much floor space that land could accommodate.

596. MR LONSDALE: Yes.

597. MR CAMERON KC: Let's go to how the assumptions work, and I'm going to start with the assumptions and then I'm going to go to the numbers but I don't want to confuse the assumptions with the numbers. So go to slide 5 please, A81(5) and at the moment we're going to ignore the absolute numbers. What is the land to building ratio?

598. MR LONSDALE: The land to building ratio is simply the amount of land that we deem you should build on. So approximately one-third of the land for buildings and

two-thirds of the land for the public realm. And that's in line with the study that we did in the 2018 SRF, and it's in line with the developments coming forward in Manchester, such as Mayfield.

599. MR CAMERON KC: You say, 'In line with the study', and then you mentioned the Strategic Regeneration Framework, SRF. Were you involved in the preparation of that SRP?

600. MR LONSDALE: Yes, I was involved throughout.

601. MR CAMERON KC: So land building ratio is one concept and there's another concept on density; how's that approached?

602. MR LONSDALE: That is the amount of building that you can put on the land available. So, we've picked an approximate density of four, which 10 is in line with the 2018 SRF. What that means is for every 1m<sup>2</sup> of development land that you have, you can build 4m<sup>2</sup> of building. We already know that you can put that building on a third of the land available and therefore, over the SRF area you get an average of 12 stories for each of the buildings.

603. It's a very high level, broad brush way of assessing density and how much volume you can get across a large area of land.

604. MR CAMERON KC: So just on the arithmetic, you've got a third which you can put buildings on because two-thirds who are having public realm and other things.

605. MR LONSDALE: Yes.

606. MR CAMERON KC: On that third you've got to get an entity of four, so you're only using a third, so you need 12 stories to achieve that, on average.

607. MR LONSDALE: On average.

608. MR CAMERON KC: Does that mean you have to have 12 stories on every plot?

609. MR LONSDALE: No, because that'd be quite bland city scaping. You go higher in certain areas and lower in other areas due to context, but the average is 12.

610. MR CAMERON KC: That floor space index of 3.9 or four, can we just have up

A79(39), please? Now on the right-hand side there we've got, 'Density'; this is from the Strategic Regeneration Framework and what was the density used there?

611. MR LONSDALE: Four.

612. MR CAMERON KC: Still on approach, when you carried this out, do you take the same approach when considering surface station and underground station or different approaches?

613. MR LONSDALE: You apply exactly the same principles. We try and treat the two as fairly as possible.

614. MR CAMERON KC: Thank you, When we see – if we go to slide eight, please, A81(8) – and on the right-hand side are some massing drawings.

615. MR LONSDALE: Yes.

616. MR CAMERON KC: And that has indicative massing; are those fixed building heights and masses?

617. MR LONSDALE: No, they're not. It's indicative to give people a sense of scale and opportunity.

618. MR CAMERON KC: And just so that we've got this in context and this concept of 3.9 or four, if we go to slide 9, how does that compare with existing development in central Manchester?

619. MR LONSDALE: So, in central Manchester in recent years you've seen areas, development going higher and higher in density. So, Portugal Street East, which is an area development that actually sits right within the Piccadilly SRF, that's got current density of around six and that's based on buildings that have been constructed, buildings that are granted planning application and buildings currently in construction. So that area has progressed significantly.

620. Then there's other developments such as Circle Square, again, high density development within the within the city centre and they're coming in around five. And then you've got developments such as Deansgate Square, which I'm sure you've seen on the horizon as you came up to Manchester, and that's double the density. So, our

initial density of four we feel is reasonable. And you certainly could argue that it could be higher.

621. MR CAMERON KC: Right. If you go to slide 11, I think that's just a summary of the methodology and then we're going to come back to the numbers. You've got the land, you applied the density factor, you arrive at the floor space and you applied the building to land ratio.

622. MR LONSDALE: Yes.

623. MR CAMERON KC: Good. Let's go back to slide 6, please, because we're going to go to measurements. The measurements for the surface station, how did you go about working out how much land would be taken up by surface infrastructure?

624. MR LONSDALE: We've looked at the permanent surface infrastructure and that's highlighted in the pink colour. You've obviously got the footprint taken by the HS2 and NPR station. You have an area that is the Network Rail access ramp and that's considered permanent rail infrastructure that you need in both scenarios. So again, that's exactly the same in both scenarios.

625. Point 3 is a pocket of land that is isolated with the HS2 viaducts; you need to build in a new road gyratory, and you take the HS2 viaduct right through the middle. We feel that the land there is very constrained and not suitable for development.

626. Point 4, you've got the trucks and embankments and the like. And then there's a few other points. Points A and B; point A is the HS2 carparks. That's not a difference because you need a car parking solution in both overground and undergrounds, and B, also the opportunity for taxis. Again, that can be picked up in public realm and both overground and underground need solutions for. Again, it's not a difference.

627. MR CAMERON KC: Then if we go to the underground, the next slide, A81(7).

628. MR LONSDALE: The pink element at one, that is the station entrance; you still need station entrance to get people in and therefore then down to HS2 and NPR. Point 2 is the loading bay but that is such that you could build over, station development over the top of the loading bay. Point 3 is the crossover box. Again, you can build public realm or over station development, at least over the majority of the crossover box.

629. Points A and B, again that's, they're exactly the same; point A being the carpark, it's the same in both scenarios, and point B is the multimodal interchange taxis and so on. That needs a solution in both.

630. MR CAMERON KC: So can we now go back to slide 5, please, where you had the figures. And I said there before I wasn't going to ask you about the figures because I asked you about methodology. Can I now just ask you about the figures? Now, are there any changes to those figures?

631. MR LONSDALE: Yes, there's one change that's come to light. It would probably be easier to explain on slide 6 actually.

632. MR CAMERON KC: Right, good idea.

633. MR LONSDALE: On slide 6, we have the area for the taxis. We had previously included that in permanent surface rail infrastructure, but on reflection, I believe that's unfair because it's actually needed in both instances. That is around about 5,000m<sup>2</sup>. So, we need to amend our figures to take into account that that change which is a change that we can go through actually on slide 5.

634. MR CAMERON KC: Let's go through it on slide 5, please. So, you've got to take 5,000 off the 157,300.

635. MR LONSDALE: Yes, that's right. So you get 152,300m<sup>2</sup> is our view of the difference in land take. Then you times that by the land to building ratio of 67%, which means that you have an additional 100,002m<sup>2</sup> of additional public realm with the underground solution.

636. When you look at additional floor space that we get, again it's exactly the same figure for land available, 152,300m<sup>2</sup>. Times that by approximately 4, 3.9. We put that through a conversion rate of 72.5%. Now, the reason to do that is because the economic analysis needs net areas, so the actual rooms rather than all the receptions and the staircases and the lifts.

637. So we put that through the approximate conversion factor and we end up with 430,700m<sup>2</sup> of additional floor space available.

638. MR CAMERON KC: Thank you. Now let us turn please to slide 12; we're jumping about a bit but trying to do this efficiently.

639. CHAIR: Just to jump in on that; on this additional 40 acres or whatever it was of development land, have you quantified what that is worth in terms of development land today, in today's pricings?

640. MR LONSDALE: I haven't looked at the prices, no. Just looked at the extra land take that's available.

641. CHAIR: One of the contentions of the petitioners I believe is that, if there's additional development above, that would potentially be a source of helping to fund some of the underground; is that not... Because I think the Leader in her statement said or made reference to the idea that, if there was a lot more developable land available above ground, then there would be the possibility potentially, that some of that could be used to help fund the project for an underground station. It was made in a vague reference, I believe.

642. I mean, I could be completely wrong, in which case I apologise absolutely to whoever I've impugned.

643. MR CAMERON KC: You're not wrong, sir.

644. CHAIR: Oh good, thank you. I tell people I never am, but people –

645. MR CAMERON KC: If you're chairing a committee, you're never wrong from our perspective.

646. CHAIR: You can tell this a lot. Okay, but you have to quantify that, then.

647. MR CAMERON KC: What was said on behalf of the petitioners was, and I summarise, was that the petitioner authorities would be open to a discussion. I don't think I could put it any higher than that, and one has to bear in mind that there is, for example, a local contribution expected to the airport station, so this – not quantified – but there have been discussions there and they are open to discussions.

648. CHAIR: Alright, thank you. Sorry for interrupting.

649. MR CAMERON KC: So, what we were turning to was slide 12 and we were going to look at the approach that's taken by HS2 in their calculations so that we can examine and focus on the differences. So, slide 12 is taken from an image which is now in the promoter's exhibits. What approach have they taken when they've been considering land take around the station? On the left we can see the surface scheme and on the right, we can see the underground scheme; what have they done?

650. MR LONSDALE: HS2 argue that the underground station building at surface actually takes up a greater amount of land than the underground. They've pointed out or they've argued that the underground station would take up 91,540m<sup>2</sup> surface, whereas the surface station would be less at 90,221m<sup>2</sup>.

651. The difference there is that HS2's calculations include public realm as though it's impeding development, but our argument is that the public realm's the absolute thing that needs to support development. So, there's a significant difference in how the two have been calculated.

652. I think that point becomes clear on the next slide as well, because you can clearly see on the next slide that – slide 13 – the HS2 surface turnback solution on the left takes up more land at surface than the underground solution on the right.

653. MR CAMERON KC: Again, trying to concentrate on the matters in dispute and it will be up to HS2 to explain it, but your understanding, what they've said is in effect, with that 90,000m<sup>2</sup>, the station takes up about the same amount of space on surface and underground, so any gain you get in their world is only on the eastern land.

654. MR LONSDALE: That's right.

655. MR CAMERON KC: And is that the right approach or the wrong approach?

656. MR LONSDALE: That's the wrong approach in our view because, as we said, the landscape is absolutely think that enables high-density development rather than impeding it. And what we're talking about is freedom of land that can be either used for public realm or development. The exact locations, the development and the public realm, that has to be decided over time. Our drawings are just indicative but the land that freed up can be for either public realm or development.

657. MR CAMERON KC: So on your land building ratio, does that take a kind of public realm over the whole area you look at or not?

658. MR LONSDALE: It does, yes.

659. MR CAMERON KC: Thank you. That's on calculating land area; land use – and these are assumptions as to commercial and residential development – is there an indication in the SRF, the Strategic Regeneration Framework, as the approach to be taken to commercial and residential?

660. MR LONSDALE: Yes, there's percentages set out in the 2018 Piccadilly SRF and we use exactly the same proportions here.

661. MR CAMERON KC: Can we have A79(43), please? So, we have absolute numbers there, and it's a smaller area than the area we're looking at, but there's a proportion one could work out of commercial, residential, retail, leisure, hotel, etc.

662. MR LONSDALE: Yes.

663. MR CAMERON KC: And is your approach consistent or inconsistent with that?

664. MR LONSDALE: It's consistent.

665. MR CAMERON KC: And if we then go to your slides, let's just have a look at how this has been applied. How do you apply it across the area? Let's say, taking your approach to density on slide 8, how do we know how much is commercial and how much is residential? Do we know that from that side or not?

666. MR LONSDALE: We don't know it from that slide, no.

667. MR CAMERON KC: How do we find out how much you've assumed to be commercial and how much to be residential?

668. MR LONSDALE: It's not in the information.

669. MR CAMERON KC: But how have you done it?

670. MR LONSDALE: How have we? Sorry, could you say that again, please?

671. MR CAMERON KC: Yes. How have you decided how much is commercial and how much is residential?

672. MR LONSDALE: That takes the proportions within the 2018 SRF.

673. MR CAMERON KC: Thank you. If we go to slide 17, please, this is where you're responding to HS2, it's on the same point. And point 5, you say, 'HS2 Ltd does not agree that the configuration of use is assumed in the MCC reports which places residential space at the front of the station and commercial development in the eastern zone is realistic'. Have you placed residential at the front of the station?

674. MR LONSDALE: No, I haven't.

675. MR CAMERON KC: If we look on the right you say you've distributed it in line with the SRF.

676. MR LONSDALE: Yes, that's right. We agree commercial space should be to the front of the station and along the boulevard which is consistent with HS2's comment and consistent with our 2018 Piccadilly SRF.

677. MR CAMERON KC: Can we go onto slide 18, please? Point 10, I won't read it all out but we can see the approach taken by HS2 and your response. Do you agree with HS2's approach?

678. MR LONSDALE: No.

679. MR CAMERON KC: Why?

680. MR LONSDALE: Well, in summary, our images are indicative and they've made a lot of assumptions based on those images to try and back calculate and work out how much area is there.

681. MR CAMERON KC: Thank you. We're doing this as quickly as we can. If we then go to slide 20, please. There's a bullet point 12 and you say there, 'The land take could reduce to 15.7 hectares', so that's under the 40 acres, it's 38.8, and it would come down a bit more if you took those 5,000m<sup>2</sup> off that you've referred to.

682. MR LONSDALE: Yes.

683. MR CAMERON KC: And then you say, 'However, increasing the density to 4.2', so that's the floor space index, that's the four we looked at earlier, 'You'd get back up to the 476,000m<sup>2</sup> difference'. With the extra bit off that you've referred to, how much would the FSI have to go up to?

684. MR LONSDALE: You'd need to take it up to 4.3 which to understand that, that's on average one level across the whole SRF. So instead of the 12 we were talking about, that would mean 13. So that's the scale of increase.

685. MR CAMERON KC: And compared to the development that's taken place in the SRF area, would 4.3 be generally consistent or inconsistent? We looked at the figures for those other sites.

686. MR LONSDALE: Well, consistent, because you see Portugal Street East already going up to six.

687. MR CAMERON KC: Thank you. Can we go to slide 14, please? Here you've got your key points.

688. MR LONSDALE: Yes,

689. MR CAMERON KC: Point 1 has to change to 430,700.

690. MR LONSDALE: Yes, that's right.

691. MR CAMERON KC: Point 2, the 4.2 changes to 4.3 which you just said.

692. MR LONSDALE: Yes.

693. MR CAMERON KC: Would you like to take us through 3, 4 and five, please?

694. MR LONSDALE: So the environment of development areas 3 and 4 is impacted by severance which will be felt by the communities that used this space. However, this is an additional consideration. So any talk about an area that's severed having an impact on its quality, that hasn't been factored into the figures, but it's something else I think we'll come to, to talk about severance.

695. The land take calculation method we believe provides a fair comparison between the surface and turnback solutions. Picking up on the difference is high level and

strategic and intentionally, so it doesn't get into the really specific details of any one area. The approximate additional floor space of the original figure of 476,000m<sup>2</sup> we still think is reasonable and not an overly ambitious figure because you can tweak the density calculation. So, we still feel that figure that we've put forward initially is reasonable. There are a whole number of variables to look at.

696. MR CAMERON KC: You've explained how you got to the numbers. The last point I want to ask you about is your opinion, please, as to whether the provision of an underground station as compared to a surface station would have any – using a bit of jargon – known as placemaking benefits? We're not just talking about jobs and economic numbers but would there be any benefits in terms of master planning and placemaking?

697. MR LONSDALE: I think there would. If we could go to A68(25), please? So, you'll have seen this slide in Mr Lax's evidence. What we're showing here is there's a huge opportunity in this area for the kind of development we've seen come forward in Manchester in recent years. So it's undeveloped at the moment, it's not an amazing place at the moment.

698. If you only look at Mayfield a couple of years ago and the transformation that's happened there, you can start to see that whole east of Manchester, it's a fantastic opportunity area and opportunity for the city to grow in years to come.

699. The other point on this slide is the yellow, showing all the permanent rail infrastructure that exists. There's already a significant amount there with the surface viaducts and with the Mancunian Way. If you go into A68(29).

700. This image then starts to show the surface turnback solution. So, on top of the existing, you can see that the surface infrastructure's been layered there in red and blue for NPR, and what that does is it adds a significant more amount of surface infrastructure on top of the already surface structure that's there, and you start to build up a whole number of constraints.

701. Where you've got the viaducts really coming together in a triangular area, you start to get a really constrained environment between the viaducts where the taxis would be located and it impacts the environment in those areas.

702. You also start to get an issue where you want connectivity in the cities, so people can walk and cycle through the city easily and you start to get severance from Mayfield in the south through to the north. The gyratory that you can see there right in the centre, again, that starts to form a barrier between walking and cycling and the connectivity east and west.

703. The blue area is an area of development that becomes constrained because it's got infrastructure on all sides, it's got the existing viaduct to the south, it's got another viaduct up to the east, it's got the HS2 viaduct to the north and it's got the gyratory to the west.

704. Now that's one area, we've not factored that into the calculations as being impacted but it certainly has got an impact that the development they're compared to it being unconstrained. And then the areas of residential areas, or areas of development that we might show to the north of that, they've got viaducts going across and, of course, you prefer an apartment, say, looking out onto public realm rather than onto a viaduct.

705. The one last area actually is to the east of the buildings highlighted in blue, and there's a further four hectares there that's completely hemmed in by infrastructure. Again, that area loses flexibility to be looked at and what it might become in the future. But that again, sits outside any calculations that we've picked up.

706. So in summary, yes, we believe that the viaducts, there's significant amount of 15 hectares, as well as surface level infrastructure, puts constraints on this development area. And of course, if you move onto A68(31), you then remove those constraints and you show the opportunity for development that can come forward in the future, release land development. There's better opportunity for more walkable communities, it's far easier to circulate around and you've got far more flexibility in how this space comes forward.

707. CHAIR: Thank you.

708. MR CAMERON KC: Thank you very much. Those are all the questions I've got for Mr Lonsdale, sir.

709. CHAIR: Okay. I'm conscious of time, we are over where we thought we'd be at this point. So, Mr Mould.

710. MR MOULD KC (DfT): Mr Lonsdale, a couple of questions – well, two or three questions. A81(5), if we could put that up. The additional floor space figure, that is to say floor space released on your analysis by putting the station underground including the approach tracks and so forth. Now 444,700m<sup>2</sup>, but initially I think 476,000m<sup>2</sup> odd. That's right, isn't it?

711. MR LONSDALE: Yes, that's right.

712. MR MOULD KC (DfT): Right. Can we just go to A82(1), please? This is a note that, as you can see, Bennetts note on Manchester Piccadilly, this is a note that we were provided with two or three weeks ago by your clients. Did you write this note?

713. MR LONSDALE: Yes.

714. MR MOULD KC (DfT): Thank you. If you go to page A81(2), we can see a table and that figure of 476,000, it appears in a more precise number, doesn't it, on the right-hand column of this table, 475,993m<sup>2</sup>? That's the amount of development land which, on your analysis, you say would be released by basically putting the station underground.

715. MR LONSDALE: Yes.

716. MR MOULD KC (DfT): Yeah. And if we look to the left-hand side, we can see you've set out in this note, not I think in evidence before the Committee, the amount of development land that you say would be released by HS2's Bill scheme? It's the second column, isn't it? It's one 1,009,280m<sup>2</sup> of developable land released by the HS2 Bill surface station, allowing for the presence of the NPR approach tracks at surface as well.

717. MR LONSDALE: Yes, it's there.

718. MR CAMERON KC: Right, that's the number you calculated, that the Bill scheme running at surface to the surface station, that's the overall aggregate amount of developable land that the Bill scheme would release in Manchester? Just over a million square meters. Your work.

719. MR LONSDALE: Yes. It goes back to 21 and things have moved on since then and we're certainly focusing on the difference, which is what we've set out in the report today. But that background figure, as you point out, the 475,993 is the basis.

720. MR MOULD KC (DfT): Well you could just say yes to my question.

721. MR LONSDALE: Yes.

722. MR MOULD KC (DfT): It's, true, isn't it?

723. MR LONSDALE: Yes.

724. MR MOULD KC (DfT): Right. The difference of 470,993 is the comparison of the number that is highlighted in second column, 1,009,280 and the number that you say is the additional – the full aggregate amount that you say is released by going underground, which is 1,485,273, the third column. If you subtract 1,009,280 from 1,485,273 you get 475,993. I mean that's your basic calculation, isn't it?

725. MR LONSDALE: Yes.

726. MR MOULD KC (DfT): Right, okay. And if we look down to the next line, the split into commercial and residential and others – the commercial split of 33%, you explained that, I think, by reference to the Strategic Regeneration Framework a few minutes ago, didn't you? Mr Cameron took you to that pack page in the SRF.

727. MR LONSDALE: Yes.

728. MR MOULD KC (DfT): Yeah. And you can see that the HS2 scheme at surface would generate 333,063m<sup>2</sup> of job creating floor space.

729. MR LONSDALE: Yes.

730. MR MOULD KC (DfT): Plus the job creating floor space in hotel and retail and leisure, 30,278 in each case, yeah?

731. MR LONSDALE: Yes.

732. MR MOULD KC (DfT): And the corresponding figure for going underground on your estimate is 490,140, 44,558 and 44,558, and we see a familiar number for

commercial, the difference you estimate to be between 490,140 and 333,063 is 157,077, so that's the additional job creating commercial floor space that you say would be produced by going underground, isn't it?

733. MR LONSDALE: Yes.

734. MR MOULD KC (DfT): And you add on some jobs created in hotel and retail and leisure as well. Yeah?

735. MR LONSDALE: Yes.

736. MR MOULD KC (DfT): Right. Okay. Thank you. Now, just to set that in context, if we go to P418(40), that's in relation to the entirety of those areas that you showed on your earlier on your plans, wasn't it? The plans at A81(6) and (7), we don't need to turn them up, but those plans with the infrastructure shown shaded pink and the balance of land within the area shown green.

737. MR LONSDALE: Yes.

738. MR MOULD KC (DfT): Okay. If we go to P418(40), just I hope to help the Committee get their bearings. This is HS2's – essentially the calculation they've made in relation to developable floor space. Their estimate is that the developable floor space in the eastern zone, that's east of Mancunian Way, going underground would be 264,420m<sup>2</sup> of which 195,090 would be commercial. Yeah. And with the hybrid Bill scheme, 179,930m<sup>2</sup> overall, with a commercial floor space component of 132,661m<sup>2</sup>, and the balance is set out on HS2's calculation in there.

739. Now, I know that's not the way you've done it and you don't agree with those figures. But if we just scroll down to the next slide, P418(41) and then to 42, you can see how HS2 have approached this. This is the-this is actually the underground scheme. They've identified in the pink areas to the east of Mancunian Way that they say would become available for development. Some of those, they say, are at risk of being somewhat constrained by having running tunnels underneath them.

740. They've also added in the development areas to the west of Mancunian Way. If we go onto the next slide, 42, you can see that that's the corresponding estimate for going underground.

741. I think you said, didn't you, that broadly speaking, you and HS2 have got the same degree – you're estimating broadly similar amounts of commercial developable floor space being released by either the Bill or the underground station to the west of Mancunian Way.

742. MR LONSDALE: You mean to the east.

743. MR MOULD KC (DfT): No, to the west. You pointed out that there's a difference of approach to the station itself. You've not included the circulation space because you've treated that as open as –

744. MR LONSDALE: Public realm.

745. MR MOULD KC (DfT): As public realm. But the key point is you're not arguing that that area is available for job creating development, are you?

746. MR LONSDALE: Yes, we're arguing that that additional footprint at the west, which is significant, is available for either development or public realm, so that land has a capacity based on the density figures that we put forward. The indicative massing is very much that it is indicative.

747. MR MOULD KC (DfT): Are you really saying that you're assuming that you could carry out major commercial development immediately in front of your station building?

748. MR LONSDALE: We're saying that land, that proportion of public realm supports the high density development and it does increase the amount of commercial development opportunity by those ratios we set out.

749. MR MOULD KC (DfT): So by putting public realm there, you buy yourself some credit, as it were, to be able to increase the density of buildings to the east of Mancunian Way.

750. MR LONSDALE: Yes, you can –

751. MR MOULD KC (DfT): Right. Sort of town planners' analysis, isn't it? Of master planning or something.

752. MR LONSDALE: Yeah, it's high level indicative at this stage.

753. MR MOULD KC (DfT): I mean the point I'm on is you're not suggesting – just focus on that area to the west of Mancunian Way, i.e. on the plan – I don't if we can get the cursor to it. Mancunian Way, there we are. In terms of the commercial development plots to the west of Mancunian Way, those being the plots alongside the station itself, essentially along the Boulevard, I think that there's broadly speaking agreement in there that as to those plots to the west of Mancunian Way that would be available for commercial development under either the underground or the overground scenario?

754. MR LONSDALE: Yes, they are available for commercial development although the area of them – overall you can increase the area, but the area of those plots increases on the indicative plans that we show on A81(13).

755. MR MOULD KC (DfT): I'm speaking in broad terms; is it essentially, here's the hybrid Bill – look, just look at this image. Are we broadly speaking in agreement that those plots along the Boulevard and the station approach and development area that would be available for commercial development?

756. MR LONSDALE: Yes, we assume those ones will be –

757. MR MOULD KC (DfT): But broadly speaking, they're similar assumptions, aren't they?

758. MR LONSDALE: Yeah, in uses, yes.

759. MR MOULD KC (DfT): Yes, thank you. Okay. So on that basis, HS2 is correct to try and analyse the range of development yield or developable land for commercial, for job creating development to the east of Mancunian Way. In other words, that which is released for that purpose under the HS2 surface scheme and that which is released for that purpose, if the station were assumed to go underground. That's the legitimate focus of inquiry, isn't it, to see where additional job creation opportunities might arise through development?

760. MR LONSDALE: Yes.

761. MR MOULD KC (DfT): You're happy with that? You seem a bit diffident. I don't want to...

762. MR LONSDALE: I'd like you to just spell that out again, please. I appreciate there's time constraints.

763. MR MOULD KC (DfT): No, no don't worry. If you look at the area to the east of Mancunian Way, we have assumed in your favour that we're not getting significant commercial development within those areas, in those two white land areas, which are banded by Pin Mill Brow, do you see?

764. MR LONSDALE: Yes.

765. MR MOULD KC (DfT): That's in your favour, isn't it? Because you're saying that those areas would be available for some form of development if you didn't have the surface approach tracks and so forth.

766. MR LONSDALE: Yes, that one is in our favour.

767. MR MOULD KC (DfT): Okay. Then we've got land to the northeast of the approach tracks, which is development area five and development area six. We're both agreed, aren't we, that those areas are areas where development would be able to come forward under both the surface and the underground station scheme?

768. MR LONSDALE: Yes.

769. MR MOULD KC (DfT): And if we go to the other side, to the southwest of those approach tracks, development areas three and four and then other areas which, although they're not within Bill limits, might come forward for development; those are also areas where we both assumed some development might come forward under the surface and under the underground scheme.

770. MR LONSDALE: Yes.

771. MR MOULD KC (DfT): Right, okay. So the issue is the degree to which the presence of the surface railway running across that area, the degree to which that constrains development which would otherwise be able to come forward under the underground scheme, isn't it?

772. MR LONSDALE: Yes.

773. MR MOULD KC (DfT): Yes. Okay. And you've said, perfectly understandably, go back to 418(41), I mean, this is a proxy for your position. You've said that, if you put the tracks underground, you'd free up a substantial proportion of further land which would be able to accommodate development.

774. MR LONSDALE: Yes.

775. MR MOULD KC (DfT): Yes. And HS2 agree with you. The caveat they have is that you shouldn't assume that the land over the running tunnels would be able to accommodate very dense and tall development without the need to make some provision for strengthening the footplate etc. And in principle, that's correct, isn't it?

776. MR LONSDALE: Yes, and Mr Hindle picked up on that point.

777. MR MOULD KC (DfT): Yes. For the purposes of making a robust assessment now of what might come forward, we should factor in that there may be a limit, there may be some constraint on the density and height of development that you could feasibly build over those tunnels, those running tunnels, shouldn't we?

778. MR LONSDALE: Yes.

779. MR MOULD KC (DfT): Thank you.

780. MR LONSDALE: Our average is 12 stories for those levels and Mr Hindle feels it's perfectly reasonable that you could build to those heights.

781. MR MOULD KC (DfT): Yes. That area to the east of Mancunian way, you've made a couple of references to the Strategic Regeneration Framework, that area isn't actually covered in the Strategic Regeneration Framework at all, is it?

782. MR LONSDALE: No, that area's outside.

783. MR MOULD KC (DfT): Yes. And so that's essentially – the task of making a planning, what is appropriate for that area in terms of local plan making, master planning and so forth, that's all for the future.

784. MR LONSDALE: It is, yes.

785. MR MOULD KC (DfT): And the question is to what is the appropriate mix between commercial and residential development will be an integral part of that process, won't it.

786. MR LONSDALE: Yes, it will.

787. MR MOULD KC (DfT): And the question will arise as to whether it's appropriate, the further east you get away from the current commercial centre, whether it's appropriate to make the assumption that development should come forward in the same percentage spit of land use that is assumed for the commercial centre under the SRF. In other words, whether the commercial element should be assumed to be as high as 33%, or whether it should be assumed to be a significantly lower proportion.

788. MR LONSDALE: We feel that assumption still holds for that wider area.

789. MR MOULD KC (DfT): You might feel that –

790. MR LONSDALE: That's why –

791. MR MOULD KC (DfT): That would be a matter for the plan making process, wouldn't it, to test that?

792. MR LONSDALE: And the plan makes it flexible so that it can accommodate and respond to market conditions at a time.

793. MR MOULD KC (DfT): The market's view will be very important because there's no point promoting a local plan that says we're expecting 33% of development in this zone to be commercial, if in fact the market's not willing to support it.

794. MR LONSDALE: Yes.

795. MR MOULD KC (DfT): That must be right, as a matter of principle.

796. MR LONSDALE: Yes, but what we're saying here is that that developable land, you're talking about far less than a kilometre from the HS2 station. There are other circumstances in Manchester where you've got significant workplace SRFs within that kind of distance from Piccadilly station.

797. MR MOULD KC (DfT): I'm not putting to you that it will definitely be less.

What I'm saying is the question is to what the appropriate mix between commercial and residential and other uses in that area is a matter that is at large at the moment so far as Manchester's planning is concerned.

798. MR LONSDALE: Exactly, and that's why we've kept these calculations high level.

799. MR MOULD KC (DfT): And the next point is that the further east you get, the further away you get from Manchester Piccadilly station, don't you?

800. MR LONSDALE: You do.

801. MR MOULD KC (DfT): So if one's thinking about the attractiveness of building significant commercial development opportunities towards the east of that area, you'll have to consider the degree to which that's going to be attractive to the market if office occupiers, commercial visitors and so forth, to those offices are going to have to make their way by some means from Manchester Piccadilly station, if they've come on HS2 or on NPR to upwards of a kilometre or so further to the east; how are they going to make that journey? That's a factor that's going to be very important, isn't it, to the question in a would-be commercial developer as to whether it's worth their while building a very dense office block in the eastern part of that area.

802. MR LONSDALE: The distance is not that significant and indicatively, as you show on there, there's opportunity for a Metrolink to go out that way.

803. MR MOULD KC (DfT): But that would come at a huge capital cost, wouldn't it?

804. MR LONSDALE: It would.

805. MR MOULD KC (DfT): And is there any published investment plan to bring Metrolink into that eastern zone?

806. MR LONSDALE: I'm not aware.

807. MR MOULD KC (DfT): No, no. Okay, just a couple of other points, I think, and then I'm done. If we can just, please, turn to A79(7).

808. MR LONSDALE: Yes.

809. MR MOULD KC (DfT): This is the strategic regeneration framework. I just want to explore this briefly, this question of severance. Can we just blow it up so that we can read the middle column? I think you said you were one of the authors of this document.

810. MR LONSDALE: Yes.

811. MR MOULD KC (DfT): Do you see what it says under HS2 viaduct alignment? ‘Changed by HS2 in October 2016, the new alignment created a wedge of land between the HS2 and existing viaducts. Whilst at first challenging, this alignment has since been successfully incorporated into the revised strategic regeneration framework with a major new park extending between the viaducts, thus joining the Medlock Valley into the city centre and better connecting Piccadilly Central with Mayfield’.

812. And if we just go back out again and go back to the previous page, A79(6), yes. We can see that area. We can see the green, if we just go towards the top of the page. Just run the cursor underneath the HS2 viaduct and then underneath the existing railway viaducts. That’s it there, yes. That’s the area – sorry, the cursor’s gone. That area there is what that summary was referring to, isn’t it?

813. MR LONSDALE: Yes.

814. MR MOULD KC (DfT): So Manchester City Council’s on record as a planning authority, so saying that we shouldn’t necessarily see railway viaducts as a problem. We should see them as an opportunity to place-make, to create public space, to connect and so forth.

815. MR LONSDALE: The 2018 SRF is dealing with the significant constraint of having the overground viaducts.

816. MR MOULD KC (DfT): Yes.

817. MR LONSDALE: And during that SRF, as planners, you work with the constraint and you do absolutely the best you can to make it work. So you look at how you might be able to link Mayfield with Piccadilly north. Actually, over time, those viaducts have come closer together. It’s made that space between the two more and more constrained, more and more difficult to work with. And, yes, so there’s one aspect of, ‘Yes, let’s work with constraints’, but here we have the opportunity to remove those

constraints and treat that in a completely different way and an opportunity for the whole future of this area and then greatly improve what we see on screen.

818. MR MOULD KC (DfT): The point I'm putting to you is, and this is very much what you – I don't know if you wrote that paragraph but what this document that you co-authored recognises, that you shouldn't exaggerate the nature of a constraint like that. If planners are asked to respond to a challenge by creating an opportunity then they can do so. They're skilful at doing so, aren't they?

819. MR LONSDALE: Yes, the point is exactly the same. You can and should respond to constraints, albeit we've got a chance to remove the constraints here.

820. MR MOULD KC (DfT): Yes. The final point is at A79(73). We can see that the Manchester Planning Authority's aspirations so far as the station is concerned is, 'a world class intermodal transport facility and architectural statement befitting of Manchester'. And if we go across to the right-hand side of the page, please, see how that translates into levels. 'Level changes are being minimised throughout the station to ease access and transitions between transport modes and maximise the passenger experience. The concourse levels are located between the services, which are for easy navigation, and visual links have been incorporated as far as possible to assist in way finding'.

821. Now that was a different station design but the idea that you need this statement, if you like, architectural statement, and that you need to minimise the degree of level changes, does that remain a strategic aspiration of Manchester City Council?

822. MR LONSDALE: Yes, at city level, you want to remove the level changes so that people can flow around the city as best as possible.

823. MR MOULD KC (DfT): Can we just please put up P418(19)? I'll read the first sentence of this slide. 'To return to surface level from platform level under option B1, for passengers arriving to Manchester or accessing other trains at the mainline station, would require a level change of 24 metres, 79 feet. For comparison, the London Underground westbound Jubilee line platform at Westminster is 25 metres, 82 feet deep below ground level'.

824. Now I don't think that the levels for the underground scheme that's before the Committee, I don't think those levels have changed significantly. So a planning authority that is looking to minimise level changes is contemplating a station design in which every passenger who wishes to alight or to embark at Manchester, has to go down to a depth, which is comparable to the depth of the Jubilee line platforms at Westminster underground station.

825. MR LONSDALE: Yes.

826. MR MOULD KC (DfT): Thank you very much. That's all my questions.

827. CHAIR: Thank you, Mr Mould. Mr Cameron, did you have –?

828. MR CAMERON KC: One point please, sir. Mr Lonsdale, you were asked a question early on about public realm and public realm releasing on a land for development and it was put to you as a town planner's point. Do you remember that question?

829. MR LONSDALE: Yes.

830. MR CAMERON KC: How does this work? If you produce public realm at the surface, what opportunity does that give you for denser or other development?

831. MR LONSDALE: Well, we've established in our density calculation that each metre square has got a certain carrying capacity and that carrying capacity is for either public realm or development in the way that we set out in the calculations. How you distribute buildings, how you distribute that, is up to all sorts of different principles contained within the SRF about where you might have height, how and where you might distribute those buildings.

832. MR CAMERON KC: If you have more public realm to the west of Mancunian Way, as you do outside the proposed station entrance, what opportunities, if any, does that give you for development in that area?

833. MR LONSDALE: At the same ratio, it gives you opportunity for development in that area. By having public realm located there, you can simply build higher adjacent to it.

834. MR CAMERON KC: Thank you. No other questions. Wait a moment. You can say you can build higher and adjacent to it, I think you just said. How much higher?

835. MR LONSDALE: Well again, that's governed by the overall density but there's no real limit. You see tall buildings in Manchester. There's no real limit on how high you might go but, again, using that density factor to make it fair between underground and overground.

836. MR CAMERON KC: Thank you very much, Mr Lonsdale.

837. CHAIR: Thank you. I'm just interested in this depth issue of the Jubilee line comparison. I don't know whether it's Mr Lonsdale that can answer this or whether, Mr Cameron, you know the answer to this. But to get down to that depth in the underground is, I think it's one set of stairs and three escalators. What's the proposal?

838. MR HIGGINBOTHAM: It's four escalators.

839. MR VICKERS: Three escalators.

840. CHAIR: Three escalators, one set of stairs? Well, it's three or four escalators. We don't seem to be able to agree but the Chairman's never wrong remember. We heard it, but it's three or four. What's the proposal for getting out? I mean, that's probably an unfair question to ask you at this stage, just because it came up here.

841. MR CAMERON KC: I'm going to find out that answer, sir, and then I'm going to give it to you because there will be somebody here – two escalators.

842. CHAIR: Two escalators, right, okay, to get to ground level from station level and platform level, okay. Okay, thank you. Mr Vickers?

843. MR VICKERS: Mr Lonsdale, the phrase in one of the screenshots we had a few minutes ago said, 'a generous retail provision is made'. Now, we all know that retail is changing dramatically and also working patterns are changing. In terms of commercial development and so on, and the projections that you've made, what provision have you made for changes in the likely retail and demands for office space, for example?

844. MR LONSDALE: Again, I think all I can come back to is with the amount of flexibility that's built into the overall plans, that as markets change, the masterplan can

change to adopt. I mean, the original provisions in the 2018 SRF is looking at retail in the bases of the building, active frontage, making that environment in that area as welcoming as possible.

845. MR VICKERS: So, I mean it could be that you end up actually with more residential development, for example.

846. MR LONSDALE: You could, yes.

847. CHAIR: And your contention, Mr Lonsdale, is still that – the interaction between you and Mr Mould was very interesting and telling with regards to what land is developable and what land isn't and you were in broad agreement in terms of some of those parcels of land. But your evidence is that the severance element, which occurs with the overground option, makes that land much less attractive to development.

848. MR LONSDALE: Yes.

849. CHAIR: Much less attractive to residential, to commercial or to both?

850. MR LONSDALE: To both, because you can imagine areas that are landlocked entirely by infrastructure. I think probably a little bit more sensitive on homes because of people living right next to viaducts and that's why, on one of our slides, actually on the surface turnback, we've put the commercial area in the area that's between the viaducts because that feels more appropriate at this stage because, again, it's indicative.

851. CHAIR: Okay, thank you. Any further points? No? Mr Cameron, anything further?

852. MR CAMERON KC: Nothing further from me, sir. I've got one more witness.

853. CHAIR: Have you?

854. MR CAMERON KC: Yes, I'm afraid I have.

855. CHAIR: Right, we're going to – I mean I'm conscious that we've only got 20 minutes, no, 15 minutes left. I don't really want to run over tomorrow, because it's eating into Mr Mould's time then. Thank you, Mr Lonsdale. Can we be as quick as possible without impeding your arguments, of course?

856. MR CAMERON KC: Yes, sir. I'll call Dr Simmonds. Dr Simmonds, this is economics next. I'm not feeling too sorry for Mr Mould, sir, and his time, given he's had quite a chance at cross-examination.

857. CHAIR: Yes, I was wondering when that was going to come up. We've been very generous in both directions but we do, of course, have to make progress though and presumably, Mr Mould, you want to kick off at 9.00 tomorrow with your arguments.

858. MR MOULD KC (DfT): Yes. I'm going to try and make sure we focus only on the points we really need to get out to you and I'm conscious of the need to give Mr Cameron as much opportunity as I can to ask his questions.

859. CHAIR: Okay. Does that mean, yes, you want to start yours at 9.00 tomorrow?

860. MR MOULD KC (DfT): Yes, yes it was. Yes, sorry. Yes, here am I. I complain about witnesses not answering questions and here am I not – touché, yes.

861. CHAIR: Mr Cameron?

**Dr David Simmonds**

862. MR CAMERON KC: Thank you, sir. So, Dr Simmonds, can we go to your A65(3), please?

863. CHAIR: We will give you 10 minutes more today on the basis that there's three of us have agreed that. So if Grahame can't, we'll still be quorate. I'll understand. So we'll give you until 10 past, if that's alright, to try and assist as much as possible.

864. MR CAMERON KC: Thank you very much, sir. Page 65(3), focus of the analysis. What is it that you're comparing in your analysis?

865. DR SIMMONDS: What we are comparing in this analysis is specifically the effect of the underground station compared with the surface station. This is illustrated in the bar on the right-hand side of this exhibit, which illustrates in purely hypothetical numbers, how the economy in general, or in Greater Manchester in particular, may grow over time, the present situation being shown by the blue line, which is measured arbitrarily as 100; underlying growth that's at lower levels in the past, indicated by the small orange addition to that; the economic impact of HS2 and NPR as proposed in the

Hybrid Bill, being the green bar on top of that; and then the effect of the underground, which we're coming on to in a minute, surface station being the small red addition on top of that.

866. And then this is illustrated over time, how did I get to this in the graph below that. The green line here represents the situation as with the Hybrid Bill. That's taken as the base line and what I shall be giving evidence about is the impact of the underground scheme compared with that, and that graph illustrates the possibility that that would have some negative impact. It would be worse in the short run but better in the long run. This is purely to explain what it is that we are comparing. These figures are purely for the sake of illustration.

867. MR CAMERON KC: And, as with any analysis of this type, it depends on the assumptions you make or the inputs. So let's just go to the inputs. Can we go to A65(9)? That, I think, gives us the floor space that you've assumed, the additional floor space that you get as a result of going underground rather than overground.

868. DR SIMMONDS: Correct, and this is based on the work that's previously been described.

869. MR CAMERON KC: And then if we go on to the next slide, A65(10), you've got the breakdown of the floor space, which you've taken from the previous slide, and you've got jobs allowed by reduce land-take?

870. DR SIMMONDS: That is correct. That's based on the floor space figures divided by industry standard, if I can call them that, floor space per full time equivalent job and the resulting number of jobs that can be accommodated here, and perhaps I can prevent or remove the confusion. There is a lot of reference, I think it's mainly in Mr Mould's questions before on the jobs created. What I'm talking about are jobs accommodated and we recognise that these may well be jobs, which under the Hybrid Bill proposals would be somewhere else. So we're not talking about creating jobs. We're looking at the effects of where those jobs are located.

871. CHAIR: Okay, so there's more developable land; there's more buildings, so there's more jobs, but your contention is that the 14,000 would be located elsewhere, possibly within Manchester then.

872. DR SIMMONDS: Thinking about it in terms of the underground option compared with the surface option, I'm proposing, and this is based on previous analysis which I agree with, in the shorter term, jobs might well be drawn in here that otherwise would be located elsewhere in Manchester or in Greater Manchester. In the longer term, they are probably jobs, which otherwise would have had to be accommodated outside Manchester.

873. CHAIR: In what proportion? Do we have an assessment on a proportion? Because I mean the headline of you get five million square feet of extra developable land and there's 14,000 jobs come is quite a persuasive one in many ways but if we're saying many of those jobs would already be within Manchester and already part of the local economy, it would be get an assessment of what's, of that split, how many do we think would not be accommodated in Manchester, elsewhere?

874. DR SIMMONDS: In the short term, that would be the case. I would have to go back and look up these figures to answer that question in quantities.

875. CHAIR: Okay, thank you.

876. MR CAMERON KC: We're going to go to timeline and then we're going to go to what you call agglomeration benefits so we can see how you get your benefits. So if we go back to exhibit A65(8), we get the timeline. What are the assumptions you've made as to when the station opens with the underground option? You've got, 'Surface Station 2036' and then you've got 'Underground Option Main Assumption', and 'Underground Option Variant'. What do those two latter headings mean?

877. DR SIMMONDS: The main assumption is that the station would open in 2039, which is the three years later than the surface option, which is the position of the Greater Manchester Partners and in the main assumption, the additional development is assumed to take place after that. The variant makes the same assumption about the station opening but brings forward the additional development, the 16 hectares or 40 acres, to the same timing as with the surface station, which is a reflection of the fact that since the underground station would not involve building viaducts across the area in question and indeed, as Mr Hindle's explained, a lot of the work would be done in deep tunnelling and contained within the tunnels. It's not clear at all, I think, that the additional development needs to be delayed until the station is complete. From the point of view

of carrying out the development, it could take place at the same time as if it was the surface station being built or even, conceivably, earlier.

878. MR CAMERON KC: Okay. So those are assumptions. Now let's just have a look at benefits. Can we go to A65(5) first of all? And you've already said that you've carried out this assessment in accordance with guidance – well, you haven't said it. You say it on the next page – the transport analysis guidance, which is issued by the DfT, I think, Department for Transport. So if we go to slide A65(5), you say, 'The present analysis is particularly concerned with agglomeration benefits, which depend on access to economic mass of each place', and you explain how you can improve access to economic mass. Now, for those of us who don't deal with economics every day, what do, 'agglomeration benefits', mean?

879. DR SIMMONDS: Agglomeration benefits are the benefits of extra productivity that arises in some industries, a considerable range of industries but not necessarily all, when jobs are close to or well connected to other jobs, not necessarily jobs in the same sector but that can play an important part. But it is well established that if jobs are located close to or very well connected with other jobs, then productivity tends to rise. I mean, that historically is part of the basis for actually having cities. It's part of the reason why London, Manchester, Edinburgh and so on exist as cities, rather than their inhabitants and their jobs being scattered.

880. So the existence of this effect is well established and has been observed in many places. Methods of observing it are varied but what is clear is that it can be improved either by improving access to other jobs, which typically means improving the transport, or by rearranging the economic mass, i.e. the jobs, where those jobs are located, and that is why I use the phrase, 'access to economic mass'. There are other terms available but, 'access to economic mass', does help to keep in mind that we're talking about both access to the transport bit and the economic mass where the jobs are.

881. In the present case, there are two effects going on. HS2 and NPR, will on different scales improve the access to, but the increased development that is enabled by the underground will allow an increase in the economic mass in central Manchester and therefore whilst the benefits of HS2 and NPR are common to the surface and the underground, their benefits are amplified and more benefits are created by bringing the

jobs into central Manchester.

882. MR CAMERON KC: And then if we go to A65(11). You sought to quantify these agglomeration benefits using the methods that you've referred to. So how does this productivity increase and access to economic mass? How does it manifest itself in overall economic benefit?

883. DR SIMMONDS: It will manifest itself in broad terms in higher gross value added, which in practice means that workers will be paid higher salaries and firms will make better profits. That is the definition of the value added. The calculations specified in the DfT guidance are quite detailed and they were carried out in earlier work last year. What I've been particularly involved in since January/February, is updating those for the changed opening years and the impact of the different assumptions about the development timing and that leads also – and in drawing from the expected profile of benefits over time, to get back to a present value, measured in 2015 prices, which is a standard unit for the HS2 economic work.

884. And all of that, which is a lot of work, rather briefly described, comes to the figures that are shown on 65(11), that the value, present value, discounting future benefits in line with the DfT and the Treasury guidance/instructions, the present value of the rising from these agglomeration benefits, as a result of the additional development, that the underground station allows, compared with the surface station is £3.6 billion in the core assumption, that the 40 acres are developed after 2039; or £4.2 billion if the development takes place after 2036.

885. MR CAMERON KC: Thank you. And then if we go onto exhibit 12, A65(12), how do you use those figures to assess what the DfT describes as value for money, in terms of a benefit cost ratio?

886. DR SIMMONDS: This is, in a sense, much simpler than the previous stages because it involves calculating the benefit cost ratio. So that is the present value of the benefit, which I just described, divided by the equivalent present value of the costs, in the same units, essentially. So the table on A65(12), the top line is the Greater Manchester Partners estimate of the costs, estimated in 2021 at 2015 prices, ranging from £2.15–3.25 billion. That is on the same basis as the additional costs and I think we've established that so far as the agreed figures are concerned, those figures remain

current, as of this afternoon. We then have the main estimate of the benefits and the variants, that's the £3.6 billion and £4.2 billion that I've already mentioned and that gives rise to a range of benefit cost ratios, going from – if the high cost one is necessarily worst, high cost with later development, a benefit cost ratio of 1.1. So for every pound that will be invested, there will be a return of £1.10 up to with the low costs and the more advantageous earlier development, a benefit cost ratio of 2.

887. MR CAMERON KC: And you've got an additional table. I'm going to come on to that in a moment but exhibits 13 and 14 are dealing with other economic benefits. Are they taken into account by the analysis you've referred to before?

888. DR SIMMONDS: No. The two slides here, which make up one exhibit, so A65(13) and (14), are the list of additional benefits, which I identified in my report a couple of months ago. I should it make it clear that that is using benefits in the sense that economists tend to do, that they can turn out to be positive or negative, and that is indicated in the last column there. Since then, there have been some further points that have been raised. The scope of the analysis, and indeed my work, has changed a bit and that is picked up in the additional table, which you're going to come on to in a minute.

889. MR CAMERON KC: So the additional table, which I think is A80, if we can have that up, you're just going to have to take us through this additional table. There's a whole variety of different BCRs based on different assumptions.

890. DR SIMMONDS: Yes. I trust that Mr Mould has his wet towel ready. Well, table 1 of 80 is starting from the calculation that I've just described that was in the A80 document and in my previous report. So what is labelled as row A, the figures there are the same ones that I've just been talking about but they're laid out in a slightly different order. But, again, these are just showing the benefit cost ratios. There's more calculation that lies behind these. As we've seen with the later development and the higher cost, the BCR, the benefit cost ratio is 1.1 and with the slightly earlier development and the lower cost, the BCR goes up to 2.

891. MR CAMERON KC: And then you've made adjustments for passenger delay at Piccadilly. That's people getting up and down to the station, is it?

892. DR SIMMONDS: That is correct and I'm grateful to so far anonymous

colleagues at DfT for having helped to produce these figures and hence to quantify something that wasn't originally quantifiable. So that line B shows that all of the benefit cost ratios get a bit worse as a result of allowing for the passenger delays at Piccadilly, people going up and down on the 54 escalators and 31 lifts.

893. MR CAMERON KC: There's a balance here, isn't there? I'm taking it quickly but people who are on NPR going through, benefit because they don't have the turnback so they go through quicker and people getting off, have to come off the escalators.

894. DR SIMMONDS: And we come to the first of those in a moment. So row C – I'll try to move on briskly – adjusts for the delayed opening of HS2 and this is an exception of the fundamental point, which wasn't in the original analysis, that HS2 cannot open to Manchester, and certainly can't fully open to Manchester, until the station is completed. And so we have taken an estimate in the DfT comments about the cost and then delay. We had to adjust it from their 7-year delay to our three-year. So row C gets a bit worse again.

895. There are then three different adjustments, which have been prompted by different discussions, including DfT's own work. The first one is adjusting for supply chain effects. So this is drawing on the kind of modelling that DfT have done to look at wider consequences again –

896. CHAIR: I'm just going to interrupt there. We've only got 4 minutes left. I'm not sure where this is taking us. I think the core of the argument here is that the benefit cost ratio analysis is better in all cases with your underground station option. Is that correct? I'm presuming you wouldn't be putting it otherwise.

897. MR CAMERON KC: No, absolutely.

898. CHAIR: And it would be an odd approach if not. All of these show a net positive, regardless of the circumstances. Is that correct of what we're seeing here? I'm just trying to see what the point is you're trying to make to us here, in the very short period of time we have left.

899. MR CAMERON KC: The point is, is it worth it?

900. CHAIR: Right, yes, I understand that.

901. MR CAMERON KC: The answer is, on these BCRs, yes. Dr Simmonds, we've got a figure. Just so we're fair on the next page, seven-year delay rather than three and you get different figures, delayed longer.

902. DR SIMMONDS: A seven-year delay rather than three has a very serious effect and, as shown there, it reduces the benefit cost ratio below 1. I've only shown that for the later development. If the development could still take place earlier, it would come back towards the figures we've already seen.

903. MR CAMERON KC: How do the BCRs here compare to the BCR for HS2's Phase 2B project?

904. DR SIMMONDS: The figures where the line is all the way from 1 are generally better than those for the HS2 western leg proposal. So they would tend to improve the scheme.

905. MR CAMERON KC: So, overall, if you have an underground station, and on the BCRs that you consider appropriate, do you make HS2 Phase 2B as a whole, better or worse value for money?

906. DR SIMMONDS: On these assumptions and calculations, better.

907. CHAIR: Thank you. Mr Mould, would you wish to ask Dr Allanfield questions? Because we're not going to have time in two minutes, I'm afraid.

908. MR MOULD KC (DfT): No, no.

909. CHAIR: If you wish to tomorrow, we can bring Dr Allanfield back in the morning for a few minutes, if you would like that, as long as Dr Allanfield is in – Dr Simmonds, sorry. I keep getting completely wrong, yes, sorry.

910. DR SIMMONDS: I understand.

911. CHAIR: It's up to you, if you want to.

912. MR MOULD KC (DfT): I just wanted to check whether he was expecting to be here anyway.

913. DR SIMMONDS: Yes, I am.

914. MR MOULD KC (DfT): Well, I didn't want to bring him back just in case I say it – after I've thought about it now. But do you mind then if I say, I'm going to reflect overnight.

915. CHAIR: Yes, that's fine as long as Dr Simmonds of Allanfield is here tomorrow and then it will give Mr Cameron a couple of minutes to conclude as well. We'll try and do that and obviously I'm going to be as generous back with Mr Cameron as I was with Mr Mould, in terms of cross-examining witnesses you may have. So we're trying to be as fair as we can to this process because obviously it's very important.

916. MR CAMERON KC: It may be that I can be shorter, sir, because the battle lines are drawn, so to speak, so I can just focus on certain points, hopefully, but we'll see how I get on.

917. MR MOULD KC (DfT): The other thought I had is this. I know you mentioned closing submissions. I don't know whether this appeals to you at all but we could provide you with a brief written synopsis of our closing points if that would help.

918. CHAIR: Perhaps the pair of you can have a conversation about that. I was quite keen to hear closing statements.

919. MR MOULD KC (DfT): Yes.

920. CHAIR: Because I think to wrap all this up together would be valuable to the Committee. But may we can think on that. I would rather hear them. So it's a helpful suggestion but I think we'd rather hear them.

921. MR MOULD KC (DfT): Okay, thank you.

922. CHAIR: Thank you. So we'll recommence at 9.00 a.m. tomorrow and that's the end of today's Committee. Order, order.