The Network Rail (Cambridge South Infrastructure Enhancements) Order

NRE-REB-02

Rebuttal Evidence to OBJ-08 (University of Cambridge)

The Transport and Works (Inquiries Procedure) Rules 2004

January 2022

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Contents

1 INTRODUCTION

1.1 This rebuttal evidence has been prepared on behalf of Network Rail ("**NR**") to the Proofs of Evidence prepared on behalf of OBJ-08 – University of Cambridge, which concern:

1.1.1 OBJ-08-W1-1 evidence of Colin Smith (Compensation);

1.1.2 OBJ-08-W5-1 evidence of Paul Jenkin – (Drainage);

1.1.3 OBJ-08-W7-1 evidence of Rupert Thornely-Taylor – (Noise and Vibration);

1.1.4 OBJ-08-W6-1 evidence of Paul Milliner- (Planning);

1.1.5 OBJ-08-W4-1 evidence of Karl Wilson – (Research and the University); and

1.1.6 OBJ-08-W2-1 evidence of Graham Hughes – (Transport).

1.2 It is not intended that this rebuttal proof should address further points that witnesses for NR have previously covered in their evidence; however, cross-references to relevant paragraphs of those witnesses' proofs of evidence are made where appropriate.

1.3 It is intended that this rebuttal proof should be a composite response to those issues raised by OBJ-08. In this respect, for cross-examination purposes the name of the NR witness who is responsible for each aspect of this rebuttal proof will be given at the beginning of each section below.

1.4 This rebuttal proof sets out the points raised by OBJ-08 under the topics identified above. For each of these sections, the point is summarised in in italics. This is followed by NR's response, preceded by the name of the witness making responsible for that part of the rebuttal. Within each sub-theme, there may be several points, each of which is dealt with separately in turn, and with the witness identified as described.

2 OBJ-08-W1 – Proof of Colin Smith (Compensation)

2.1 Para 2.8-2.9 discussions on compensation and compliance with Guidance - Para 2.8-2.9

Response by Bill Simms (Property)

2.1.1 I attended the 'Teams' call on 24th September referred to in Mr Smith's proof, where it was agreed that my colleague Chris Renshaw would lead on any negotiations for the voluntary acquisition of the University's land required for the CSIE Project. Towards the end of the meeting Mr Smith suggested that heads of terms setting out how compensation might be dealt with ought to be included as part of the heads of terms covering Network Rail's proposed commitments and protective provisions to be negotiated between the parties. My response was that compensation matters should be dealt with under the Compensation Code in the normal way.

2.1.2 On 28th September, Chris Renshaw wrote to the University of Cambridge to invite them to discuss the voluntary acquisition of its land required for the CSIE Project in advance of the draft TWAO. A copy of the letter is appended to this rebuttal. I note this is not referred to in Mr Smith's summary of exchanges.

2.1.3 On 18th October, Colin Smith acknowledged the letter by email and said that there was a commitment to seek to deal with the land transfer within the proposed Land and Works Agreement. However, he also said that the terms would be dependent on the extent of the Protective Provisions and the Land and Works Agreement and stated that 'it is therefore premature to engage on discussion regarding such terms at this time'. Again, I note this is not referred to in Mr Smith's summary. A copy of the email is appended to this rebuttal (Appendix 1).

2.1.4 On 28th October, Colin Smith sent an email to Chris Renshaw setting out his views on compensation. No mention of land acquisition was made in the email save only to acknowledge that it was a matter on which Chris was appointed to deal. A copy of the email is appended to this rebuttal.

2.1.5 At a meeting between the parties on 25th November held at the AMB, attended by Chris Renshaw and Mr Smith amongst others, it is my understanding that discussions were pre-dominantly centred on the CSIE Project and the potential impacts on the AMB. Paul Humphrey for Network Rail outlined the mitigation measures proposed and commitments offered by Network Rail. Heads of terms containing the proposed commitments offered by Network Rail were subsequently sent to the University within a week of the meeting, on 1st December. I am advised that discussions with Mr Smith at the meeting were limited to less than 10 minutes as he had to leave in order to catch a train. A Statement of Common Ground regarding compensation was discussed at the meeting, however, Chris Renshaw advises that it was not agreed that this was something that should be progressed, urgently or otherwise. Mr Smith advised that he was less concerned about the land acquisition and that his main concern was regarding potential compensation for the impact on the AMB and the University's ability to continue to operate. An email from Chris Renshaw concerning the meeting is appended to this rebuttal (Appendix 1).

2.1.6 During a telephone conversation on 20th December, I understand Chris Renshaw advised Colin Smith that Network Rail did not wish to enter into a Statement of Common Ground regarding compensation and that an offer for the voluntary acquisition of the University's land would be sent to him shortly.

2.1.7 Unfortunately there has been a delay in the publication of the latest iteration of the Book of Reference which has subsequently had an impact on the issue of heads of terms for land acquisitions, however terms for the acquisition of the University's land were sent to Mr Smith on 13th January.

2.1.8 In its offer to engage and subsequent issue of heads of terms for the acquisition of the University's land and rights, Network Rail can demonstrate that it has taken reasonable steps to acquire all of the land and rights by agreement in accordance with Government Guidance. Provision for compensation to landowners is set out in my Proof of Evidence and provided for within the draft TWAO. Network Rail is under no obligation to take steps to agree any additional compensation provisions over and above the compensation for the permanent land and rights it requires for the CSIE Project in advance of the TWAO. Specifically, it is premature for Network Rail to enter into discussion regarding compensation for losses arising from effects that it does not consider are likely to arise and in relation to which it has offered commitments to prevent from arising, which I understand to have been the focus of Mr Smith's concerns.

2.2 Para 4.2-4.5 - Absence of evidence to show that potential risk of substantial losses to the University have been adequately taken into account

Response by Bill Simms (Property)

2.2.1 As explained in the Proofs of Evidence of Mr Taylor (Noise impact), Mr Spencer-Allen (Vibration impact) and Mr Hameed (Electromagnetic Compatibility), the impacts on the AMB and Plot 9 and mitigation of such impacts have been carefully considered by Network Rail. Network Rail have proposed draft Heads of Terms for a legal agreement with UoC which commits Network Rail to construction activity that limits the levels

of noise and vibration within relevant areas of the AMB except when agreed otherwise. Furthermore, the Heads of Terms commit Network Rail to mitigate any potential for increased electromagnetic interference in order that there is no increased impact as a result of the CSIE Project. There are further commitments within the Heads of Terms on Drainage, Roads and other services/utility infrastructure and landscaping designed to mitigate the impact of the scheme.

2.2.2 Given the consideration that has been given to the potential impacts and the commitments that Network Rail are prepared to make, which in the absence of agreement will be offered as undertakings, in my view it is unlikely that losses from aborted research work, loss of rental income and fees, loss of direct and indirect grants and commercial income may occur as a result of the CSIE Project. Furthermore, I consider that those commitments mean that the 'worst case' scenario portrayed by Mr Smith that suggests that the University's operations at the AMB become unviable, requiring it to cease and/or relocate operations is unrealistic.

2.2.3 As such, Network Rail have not considered it necessary to provide within its funding of the CSIE Project for the costs of extinguishment of the University's activities at the AMB, nor for its relocation. The costs for compensation that are allowed for in the Property Cost Estimate for the CSIE Project are considered to be adequate.

2.3 Scheme could not bear cost of equivalent reinstatement or refunding grants totalling £41.5m – Para 5.1-5.2

Response by Bill Simms (Property)

2.3.1 As provided in the point above, Network Rail have not considered it necessary to provide within its funding of the CSIE Project for the costs of extinguishment of the University's activities at the AMB, nor for its relocation. The costs for compensation that are allowed for in the

Property Cost Estimate for the CSIE Project are considered to be adequate.

Response by Lewis Wingfield (Strategic Case)

2.3.2 As per Mr Simms' response above, Network Rail have not considered it necessary to provide within its funding of the CSIE Project for the costs of extinguishment of the University's activities at the AMB, nor for its relocation or the refunding of all grant receipts. The costs for compensation that are allowed for in the Property Cost Estimate for the CSIE Project are considered to be adequate, as is the risk and categories in the project's overall cost estimate where or if funding is required for mitigations.

2.3.3 The funds available for the project are set out in the Funding Statement (NR05) in the TWAO application. The allocation of these between categories is outlined in the Estimate of Costs (NR06). Please note that the Estimate of Costs is required to be presented in a set format that differs from Network Rail estimating. The project estimate £28.8m of risk which is there to reflect the level of uncertainty that any estimating exercise entails. Thiselements is available to be allocated to any mitigations which are not specifically included in the Estimate of Costs. Due to the constraints of format of the Estimate of Costs it was necessary to split risk between the categories specified. However it is clear that there is a significant level of headroom within the funding envelope to deal with any unexpected costs that might arise, including in relation to compensation.

2.4 Scale of compensation in respect of Plot 9 – Para 5.3-5.4

Response by Bill Simms (Property)

2.4.1 As explained in the Proofs of Evidence of Mr Taylor (Noise impact), Mr Spencer-Allen (Vibration impact) and Mr Hameed (Electromagnetic

Compatibility), the impacts of the CSIE Project on the University's land and property have been carefully considered by Network Rail, including Plot 9. Network Rail have proposed draft Heads of Terms for a legal agreement with UoC which commits Network Rail to mitigate the potential impact of the CSIE Project. Such commitments extend to operational commitments as to noise, vibration, electromagnetic interference and drainage and consideration has been given to potential impacts on Plot 9 in the commitments that have been offered.

2.4.2 The consideration that has been given to the potential impacts of the CSIE Project and the commitments that Network Rail are prepared to make (which in the absence of agreement will be offered as undertakings) are designed to keep the impacts comparable to those of the existing operational railway. In my view it is therefore unlikely that losses from additional costs of construction, mitigation and/or specialist fit out requirements will arise.

2.5 Para 5.5-5.6 - Non-compensatable losses should be weighed against the scheme

Response by Bill Simms (Property)

2.5.1 From my understanding of the evidence provided by Network Rail, sufficient information has been given to the University about the CSIE Project and appropriate mitigation for its impacts has been provided, via the commitments contained within the draft Heads of Terms.

2.5.2 Given that adequate assurances on the future construction and operation of the CSIE Project have been provided to the University by Network Rail, the costs and losses 'beyond the ambit of the statutory compensation code' suggested by Colin Smith are highly improbable.

2.5.3 On the basis that the impacts of the CSIE Project on the University will be satisfactorily mitigated, in my view the principle that compensation

issues are not to be considered when determining a TWAO should be upheld.

3 OBJ-08-W5 – Proof of Paul Jenkin (Drainage)

3.1 Paragraph 4.1 - As set out in the workshops on 2 and 3 November 2021 the main concern for the University, with respect to flood risk and drainage, is that the proposed haul road would occupy the area which currently (in the case of AMB) and potentially (in the case of Plot 9) contains the infrastructure required to effectively drain surface water from the sites.

Response by Sue Brocken (Drainage)

3.1.1 As noted in Table 4-2 and Section 6.9 of the Proof of Mrs Sue Brocken, ref NRE5.2, the presence of the proposed temporary haul road has been acknowledged and interim designs have been commenced to temporarily transfer flows from the UoC site to the NR site to ensure that the UoC is served by drainage infrastructure that remains effective during and post construction. The design will be progressed following detailed topographical survey of the site to allow the existing assets to be fully understood and integrated into the design. This will be subject of Stakeholder workshops at the next stage.

3.1.2 Network Rail are currently in discussion with the UoC to agree heads of terms which include a commitment to provide UoC with details of any temporary accommodation works proposed which may impact the drainage systems within the AMB Plot and Plot 9, and undertake that UoC will be in no worse position in respect of drainage, flood risk and water quality during either construction or operation of the CSIE Project.

3.2 *Paragraph 4.3 -If this existing infrastructure is altered without acceptable mitigation then it would increase flood risk to the AMB facility and Plot 9 and also prejudice the ability for the University to meet its obligations in respect of managing flood risk upstream and downstream towards Hobson's Conduit*.

Response by Sue Brocken (Drainage)

3.2.1 The Scheme, both in the temporary and permanent case, does not propose to amend the discharge from the UoC site to the Southern attenuation basin and subsequently into South Ditch and Hobsons Conduit. It is noted that downstream of the Southern attenuation basin, to which the UoC site discharges, there is a secondary flow control device prior to discharge into South Ditch. This Scheme does not impact this flow control hence the flood risk upstream and downstream to Hobsons Conduit specifically is not an issue.

3.2.2 In the temporary case, the overflow from the UoC site will discharge into the NR track drainage asset, that will drain into a new attenuation pond to the West of the rail corridor. This pond will be sized to accommodate both NR track drainage and the overflow from the UoC site. The discharge from the NR site will be controlled at a rate of 2 l/s/ha. As noted within Table 4-2 of the Proof of Mrs Sue Brocken ref NRE5.2, the principle of discharging into Hobsons Brook has been agreed with the LLFA and was described in the FRA, which the LLFA has accepted. Further engagement with the LLFA is proposed during the next phase, when further detailed analysis has been undertaken, ultimately resulting in an Ordinary Watercourse Consent Application.

3.3 Paragraph 4.4.1 "*Paragraph 27 - Any alterations to the drainage arrangements proposed by the Scheme would need to be undertaken in a manner that preserves the normal operation of the AMB facility, both temporarily and permanently. It is currently unclear what impacts there are upon the swale and attenuation pond that exist within the University's Estate, particularly given that the limits of deviation shown on the TWAO application drawings appear to straddle on site drainage infrastructure. Network Rail's Environmental Statement for the proposed Scheme does not obviously assess this. Network Rail*

has not committed to any mitigation measures which take into consideration the implications of the Scheme on the drainage arrangements for the AMB facility and they are therefore inadequate. As such, the Environmental Statement and the Draft Order and related suite of TWAO application documents are deficient."

Response by Sue Brocken (Drainage)

3.3.1 Commitments to mitigation measures to prevent impacts on flood risk and land drainage on land within and neighbouring the Project boundaries are described in Section 18.4 of the ES, which states that mitigation proposals would be sympathetic to the existing drainage arrangements that serve the Biomedical Campus.

3.3.2 As documented in the Proof of Evidence of Mrs Sue Brocken ref NRE5.2, the ES did not specifically assess impacts on the UoC swale that serves the AMB facility. This is because, at the time of the assessment, in the permanent case, no interface with this swale was envisaged and any temporary loss of drainage capacity could be accommodated within the land to be temporarily acquired. The assumption was that storage contained within the existing swale system in the temporarily acquired land would be provided either adjacent to its current location or elsewhere within the scheme to maintain the status quo.

3.3.3 Further design development, post TWAO submission, has identified a minor overlap between the UoC swale and the permanent land acquisition boundary. Section 6.9.6 of the Proof of Evidence of Mrs Sue Brocken ref NRE5.2 describes the works proposed by the Project, entailing some minor reprofiling of the swale and pond, to ensure full reinstatement of these assets and ensure no drainage or flood risk detriment to UoC land. Network Rail has also offered a commitment to provide sufficient temporary attenuation facilities to ensure that the

current flood storage capacity of the swale and balancing pond are replicated and that flood levels are not increased during the temporary case. Consistent with the approach described in the ES, the mitigation proposals sympathetic to the existing drainage arrangements are being employed. In my view the conclusion in the ES that effects on the existing land drainage regime, which includes the UoC assets, are 'not significant' remains valid even when the conflict described above is taken into account.

3.4 Paragraph 4.4.2 "*Paragraph 28 - The University must also understand the intended implications for the management and maintenance of drainage and landscape features going forward to protect future maintenance and building operations. At present, whilst the submitted Flood Risk Assessment suggests that it is Network Rail's intention to manage features within the Order Limits, there appears to be no further information provided in this regard to clarify which elements are temporary and which are permanent management issues, despite the deposited TWAO plans suggesting that some of the University's existing surface water drainage features fall within land that Network Rail is looking to compulsorily acquire.*"

<u>Response by Sue Brocken (Drainage)</u>

3.4.1 Since TWAO submission, having received further information provided by UoC and updated permanent and temporary land take boundary requirements, we have a more detailed understanding of the UoC drainage assets as described in Section 6.9 and 7.3.1 of the Proof of Evidence of Mrs Sue Brocken ref NRE5.2.

3.4.2 In the permanent case, the NR drainage assets will be separate to the stakeholder's assets. Network Rail therefore have no maintenance responsibility for the UoC drainage assets post construction.

3.4.3 In the temporary case, the current swale fills the width of the land to be temporarily acquired for the haul road. The proposed temporary diversion that will route drainage flows from the UoC swale to the NR drainage system, will be maintained by Network Rail to ensure the system is operates to its intended design standards at all times.

3.4.4 A commitment has been offered by NR to ensure that UoC will be in no worse position in respect of drainage and flood risk by maintaining drainage assets and their flow capacity both during construction and following completion of the CSIE Scheme.

3.5 Paragraph 4.4.4 "*Paragraph 32 - Given the inter-dependency between the AMB and Plot 9 drainage design and the potential impact upon the Conduit, the University requires suitable mitigation measures to be put in place to ensure the outfall drainage from the AMB and Plot 9 remains unaffected by the Scheme. Whilst we understand that there are protective provisions in place in relation to the Conduit itself, it does not appear to us that Network Rail has committed to any specific mitigation measures to protect the outfall drainage from the AMB and Plot 9. As such, the Environmental Statement and the Draft Order and related suite of TWAO application documents appear to us to be deficient.*"

<u>Response by Sue Brocken (Drainage)</u>

3.5.1 At the time of the production of the ES, it was not envisaged that there would be any interface with AMB or Plot 9 in the permanent case. In the temporary case, existing storage would have been maintained adjacent to its current location or elsewhere within the scheme. The ES contained overarching commitments to ensure no increase in flood risk either within or outwith the land to be temporarily or permanently acquired.

3.5.2 The current proposed arrangement described within the proof of Mrs Sue Brocken Ref NRE5.2 acknowledges the interface and seeks to ensure there is no increase in flood risk by means of a temporary overflow into

the Network Rail track drainage network, reflecting the principles relied on in the ES. Hence it is not considered that the identification of the interface will result in any new or materially different significant adverse effects would arise.

3.6 Paragraph 4.4.5 *At the time of writing no detailed information or assessment has been presented by NR that would reduce the concerns above.*

Response by Sue Brocken (Drainage)

3.6.1 In addition to the Proof of Mrs Sue Brocken Ref NRE5.2 which has sought to respond to the queries, NR has offered commitments to UoC to provide it with the proposed final drainage designs for comment prior to submission of those details to the relevant local planning authority for approval (as required pursuant to planning conditions) and to maintain UoC's existing flow rates.

3.6.2 Network Rail also undertake to provide sufficient temporary attenuation facilities to ensure that the current flood storage capacity of the swale and balancing pond are replicated and that flood levels are not increased.

3.6.3 A commitment has been offered by NR to ensure that UoC will be in no worse position in respect of drainage and flood risk by maintaining drainage assets and their flow capacity both during construction and following completion of the CSIE Scheme.

3.6.4 It is considered that the commitments offered address the concerns raised by UoC.

3.7 Paragraph Section 5.1 -*Surface water drainage is dealt with in Chapter 18 of the ES which is supported by the FRA. In Section 18.4.14 (page 18-20) it is clearly the intention that the issues of surface water drainage relating to the CBC are to be dealt with in a sustainable and sensitive manner. However, from the*

information provided in the ES and the FRA it is not possible to determine how the efficacy of the existing drainage system will be maintained or whether any mitigation is proposed to offset any impacts. As mentioned earlier the FRA is principally concerned with the direct runoff from the proposed development and the mitigation of any increase by the use of SUDS. As far as I can see there is no consideration of what might happen if the proposals interfere with existing infrastructure that drains existing development. This demonstrated in Appendix C of the FRA which shows the proposed layout of the drainage system.

Response by Sue Brocken (Drainage)

3.7.1 The ES and FRA set out the overarching principles proposed for drainage and flood risk management and as noted in T4.1 of the Proof of Evidence of Mrs Sue Brocken Ref NRE5.2, these principles were agreed with the LLFA and EA.

3.7.2 As noted within Section 6.9 and 7.3.1 of the Proof of Evidence of Mrs Sue Brocken, the UoC drainage and the proposed drainage in relation to the Scheme are to remain separate with the exception of the temporary overflow during construction. No new or materially different significant adverse effects would therefore arise.

3.7.3 Network Rail are currently in discussion with the UoC to agree heads of terms which include a commitment to provide UoC with details of any works proposed which may impact the drainage systems within the AMB Plot and Plot 9 and undertake that UoC will be in no worse position in respect of drainage, flood risk and water quality.

3.8 Paragraph 5.2 *Previously we had not known what works were proposed within AMB and Plot 9 and so could not assess the potential impacts. From the presentations at the workshops it was clear that the proposed haul road would occupy the area currently occupied by the western swale in AMB and the proposed swale in Plot 9. This creates a number of potential impacts which are*

summarised below alongside what I understand the current Network Rail strategy for mitigation to be. More information was promised following the workshops but at the time of writing none has been forthcoming. These proposals have been made subsequent to the submission of the ES and I have seen no addendum to the ES or the FRA which makes an assessment.

Response by Sue Brocken (Drainage)

3.8.1 Network Rail will provide the detailed design for the temporary drainage solution to UoC for acceptance prior to commencement of construction. Network Rail have committed, as set out in the draft Heads of Terms issued to UoC, to ensuring that the existing site drainage is not adversely impacted during both the construction and operational phases of the CSIE scheme.

3.8.2 In response to the concerns raised in Section 5.2, the ES and FRA provide an assessment of the potential impacts on existing land drainage assets (included as a receptor and assigned medium to high value/importance) within the agreed study area during both construction and operation of the CSIE Project. Section 18.4 of the ES, describes mitigation measures to prevent likely significant effects on flood risk and land drainage on land within and neighbouring the Project boundaries and states that mitigation proposals would be sympathetic to the existing drainage arrangements that serve the Biomedical Campus. Although the drainage design that has been developing since the TWAO submission, resulting in some minor changes to the drainage assumptions and solutions that the ES and FRA were based on, it is not considered that taking them into account would result in a change to any of the conclusions of the assessments presented in the ES of FRA, or any new or materially different significant effects.

3.9 Paragraph 5.3 and 5.4 *In relation to drainage connectivity, currently the surface water drainage from AMB discharges directly into the swale and a similar strategy is envisaged for Plot 9. With the swale infilled this would not be possible, and the sites could not drain effectively. Network Rail propose that a pipe or filter drain is installed beneath the haul road and that the existing drainage be connected to this. Whilst potentially feasible no detailed information has been provided to demonstrate the efficacy of these proposals*.

In relation to flood storage, the swale also provides flood storage which allows the site to discharge at the prescribed rate without flooding the site and buildings. If this storage is removed, then flood risk would increase and/or the rate of discharge may increase through over topping. Network Rail propose that the new pipe (above) is connected to the new trackside drainage and ultimately routed to the western side of the tracks where it would be attenuated prior to discharge into the watercourse. Whilst in principle this seems possible, it relies on there being sufficient capacity within the system and that the trackside drainage and new storage are in place before the haul road is constructed. Some detailed analysis would be required before I could be confident that this approach would be effective. Similarly, to avoid sterilising Plot 9 (if development is envisaged before the removal of the haul road), then the system would need to accommodate the proposed run off from Plot 9. Whilst potentially feasible no detailed information has been provided to demonstrate the efficacy of these proposals.

<u>Response of Sue Brocken (Drainage)</u>

3.9.1 In the temporary case, the overflow from the UoC site, will discharge into the NR track drainage asset, and this will discharge into a new attenuation pond to the West of the rail corridor which will be sized to accommodate the overflow from the UoC site. Flow from the NR site will be controlled to 2 l/s/ha of the track catchment only and will not be increased to accommodate additional flow rates. Capacity within the attenuation pond has been increased beyond that required for the NR catchment by 500m³ to accommodate the volume of storage within the UoC site to be temporarily lost. Based on LiDAR information, it is

understood that approximately 300m³ will be temporarily lost and replaced by a piped system. To accommodate any inaccuracies within the LiDAR an additional volume of 200m³ has been included within the NR pond to ensure capacity and spatial provision within the site.

3.9.2 As noted within Table 4-2 of the Proof of Mrs Sue Brocken ref NRE5.2, the principle of discharging into Hobsons Brook has been agreed and was included within the FRA to which the LLFA has accepted. This will be the subject for further discussion with the LLFA during the next phase when further detailed analysis has been undertaken, ultimately resulting in an Ordinary Watercourse Consent Application.

3.9.3 NR are in process of proposing Heads of Terms which include commitments to UoC relating to ongoing design discussions and temporary/ permanent interfaces to ensure the UoC are not in a way impacted by the Scheme.

3.10 Paragraph 5.5 *In relation to water quality, the swale provides a water quality benefit which cannot be replicated within a piped system, and it will be necessary for any scheme to ensure no deterioration in water quality. Whilst potentially feasible no detailed information has been provided to demonstrate the efficacy of these proposals. It is my opinion that the scope of works now apparent at AMB and Plot 9 have not been assessed in sufficient detail within the existing ES and FRA to give confidence that the impacts will not be significant. It is also not clear whether the Lead Local Flood Authority have approved the revised approach to drainage.*

<u>Response by Sue Brocken (Drainage)</u>

3.10.1 The existing UoC surface water drainage network utilises two components of treatment, currently, the first component is the permeable pavement in the car park area, the secondary component

being the existing swale. Both systems will be maintained in the permanent case.

3.10.2 In the temporary case, consistent with the measures identified in the ES as being part of the CoCP Part B, the swale will be replaced by a bypass separator which will be installed within the piped section of swale to assist with the removal of silts and oils. A section of the swale, as shown within the Proof of Evidence of Mrs Sue Brocken, ref NRE5.2, will be maintained for the duration of construction which will maintain the current two component treatment system for any flows not entering the piped section of swale. In addition, the flows diverted into the NR track drainage network will pass through a further attenuation pond, encouraging settlement of suspended sediments and associated heavy metals etc, prior to discharge into the Hobsons Conduit to the West of the rail corridor.

3.10.3 The LLFA has not been approached to discuss the detail of the current proposal as the agreed principle of the discharge to Hobsons Brook at a specified rate (2l/s/ha) has not changed since previous liaison with the LLFA (only the means by which the discharge gets there). The LLFA will be consulted during the next design phase prior to inform submission of an Ordinary Watercourse Consent.

3.10.4 Although the drainage design that has been developing since the TWAO submission, resulting in some minor changes to the drainage assumptions and solutions that the ES and FRA were based on, it is not considered that taking them into account would result in a change to any of the conclusions of the assessments presented in the ES of FRA, or any new or materially different significant effects.

3.10.5 Network Rail will provide the detailed design for the temporary drainage solution to UoC for acceptance prior to commencement of construction.

Network Rail have committed, as set out in the draft Heads of Terms issued to UoC, to ensuring that the existing site drainage are not adversely impacted during both the construction and operational phases of the CSIE scheme.

3.11 Paragraph 5.6 *While some information on proposed haul routes was contained within the ES (see the evidence of Mr Graham Hughes), I had understood from initial discussions with NR that there would be a further proposed haul road which would sever the existing surface water drainage routes from AMB and the proposed drainage routes from Plot 9. Network Rail propose a piped interceptor drain below the proposed haul road but there is no indication of its size, gradient or capacity and whether it could convey the necessary flows without surcharging the drainage system and flooding the car parks and/or the existing buildings. However, it does not appear that this has been formally submitted. I also understand from Graham Hughes' evidence that there have been further conversations about relocating construction activity to the western side of the railway line, however, again, I have not seen any further details of any proposals. For present purposes I will comment on the potential haul road along the eastern edge of the railway line.*

<u>Response by Sue Brocken (Drainage)</u>

3.11.1 The haul roads for the scheme run parallel to the railway on both the eastern and western sides, Network Rail has not proposed any additional haul road to these two primary haul roads. The eastern haul road will run between the main eastern construction compound located to the south east of Addenbrooke's Road and the proposed station eastern forecourt, and will pass through the UoC's AMB and Plot 9 sites running over the top of the existing surface water drainage routes. Network Rail propose to capture and divert surface water flows from this area into the railway drainage system during the construction phase of the

scheme. Following completion of construction, the haul road will be removed and the existing surface water drainage routes re-instated. No interface with the existing outfall routes from the AMB site or Plot 9 are envisaged.

3.11.2 As set out above, Network Rail propose to install a haul road on both the western and eastern side of the railway to facilitate the construction of the CSIE scheme. The reference to relocating construction activity to the western side of the railway has been inaccurately represented in Graham Hughes' evidence, as I am advised that at the site meeting between Network Rail and UoC on 25 November, Network Rail stated that the main works compound had been relocated to the western side of the railway but reiterated during the walk out on site that the construction haul road would still be required through the UoC AMB and Plot 9 sites to facilitate access to the proposed eastern forecourt and the associated construction activities to build out the eastern side of the station and track realignment.

3.11.3 Network Rail will provide the detailed design for the temporary drainage solution to UoC for acceptance prior to commencement of construction. Network Rail have committed, as set out in the draft Heads of Terms issued to UoC, to ensuring that the existing site drainage are not adversely impacted during both the construction and operational phases of the CSIE scheme.

3.12 Paragraph 5.8 -*In both these cases, I am of the opinion that to ensure that any impacts do not create an adverse impact on the University that a detailed survey of the existing drainage infrastructure is required and that this should be used to build a detailed hydraulic model to assess the proposals and determine that the concept scheme could be delivered in practice*.

Response by Sue Brocken (Drainage)

3.12.1 In response to the concern raised in Section 5.8, as noted within the Proof of Evidence of Mrs Sue Brocken, NRE5.2, there is no significant interface between the Project and UoC drainage assets in the permanent case. Minor reprofiling, to replace the small storage volume lost where the proposed permanent boundary overlaps with the assumed extent of the existing swale (taken from record drawings), is committed to by the Project. To confirm the exact extents of the required reprofiling, a detailed survey of the existing UoC assets is proposed to be undertaken at the next design stage.

3.12.2 The detailed survey will also inform the update of the existing outline hydraulic model, which has been produced to develop the temporary overflow solution utilising information and survey available to date.

3.13 Paragraph 5.12 *This will be further complicated since once combined with the trackside drainage it will be difficult to demonstrate that the water originating from Plot 9 and AMB has been attenuated by the prescribed amount. It may also be necessary to alter the capacity of the existing hydrobrake at the south of AMB to ensure that overall the discharge from the two plots does not exceed that which has been prescribed*.

Paragraph 5.14 *In particular it is necessary to show that overall the rate of flow into the downstream watercourses is no greater than that agreed as part of the AMB/Plot 9 designs to discharge the previous planning conditions. Failure to do this would mean that the University would not be meeting its obligations to manage flood risk to and from its buildings. The generality of these concerns would also extend to any other land or interests in land of the University in so far as drainage into Hobson's Conduit may be affected.*

Response by Sue Brocken (Drainage)

3.13.1 In the permanent case, there is no change to the existing situation with the exception of minor reprofiling of the swale. In the temporary case

the overflow from the UoC site will discharge into the NR track drainage asset, which will discharge into a new attenuation pond to the West of the rail corridor which will be sized to accommodate the overflow from the UoC site. The discharge from the NR site will be controlled to 2 l/s/ha of the track catchment only and will not be increased to accommodate additional flow rates. Therefore, this drainage solution will ensure that water originating from Plot 9 and AMB has been attenuated by the prescribed amount.

3.13.2 As noted within Table 4-2 of the Proof of Mrs Sue Brocken ref NRE5.2, the principle of discharging into Hobsons Brook has been agreed and was included within the FRA to which the LLFA has accepted. This will be the subject for further discussion with the LLFA during the next phase when further detailed analysis has been undertaken, ultimately resulting in an Ordinary Watercourse Consent Application.

3.13.3 Initial assessment does not suggest that any modifications are required to the existing flow control devices however this will be further refined following detailed topographical survey. Network Rail are currently in discussion with the UoC to agree heads of terms which include a commitment to provide UoC with details of any works proposed which may impact the drainage systems within the AMB Plot and Plot 9 and undertake that UoC will be in no worse position in respect of drainage, flood risk and water quality.

3.14 Paragraph 6.4 *Without this additional assessment of the proposed mitigation I still have concerns that the proposed approach may not deliver the required capacity or flood storage that would be required to ensure that there would be no adverse impacts on the existing drainage arrangements*.

Response by Sue Brocken (Drainage)

3.14.1 The Proof of Evidence of Mrs Sue Brocken ref NRE5.2 details the Projects interfaces with existing drainage infrastructure and where there are temporary or permanent conflicts with existing assets, sets out the mitigation proposed to ensure that there is no adverse impact in respect of flood risk and drainage. Acknowledging that the drainage design is not yet finalised, Network Rail has offered commitments whereby NR will ensure that as a consequence of either accommodation works or permanent works third parties are not put in a worse position in relation to drainage flows currently utilised. NR has also given commitments to ensure that the works will not put third parties in breach of their contractual drainage agreements they are currently required to comply with ((for example through planning conditions or Hobsons Conduit Trust Covenants) and to also engage with them on the final drainage design details.

3.15 Paragraph 6.5 *I have highlighted some of the practical and programming challenges which in my view could impact on the proposed mitigation.*

Response by Sue Brocken (Drainage)

3.15.1 In response to the concern raised in Section 6.5, the proof of Mrs Sue Brocken ref NRE5.2, Section 6.9 acknowledges the interfaces between the proposed temporary haul road and the UoC drainage assets and provides proposals based upon outline hydraulic modelling undertaken to date with the principle of providing an equivalent volume of storage lost within the UoC site within the NR drainage network with associated pipework to convey the flows accordingly. The design will be progressed following detailed topographical survey of the site to allow the existing assets to be fully understood and integrated into the design.

3.15.2 Phasing of construction will be such that the haul road east of the rail corridor cannot be constructed until the drainage network is in place. As a minimum, the attenuation pond and pipework from the UoC site to ensure storage is maintained. The phasing of construction will be reviewed in detail during the next phase of design to ensure that this is the case and will be reviewed at Stakeholder workshops at the next stage.

3.16 Paragraphs 7.2 and 7.3: *This aspect of the works has not been adequately assessed in the ES. The impacts of the haul road do not seem to have been addressed in the ES chapter covering surface water.*

Response by Sue Brocken (Drainage)

3.16.1 In response to the concerns raised in Section 7.2 and 7.3, section 18.4 of the ES, describes mitigation measures to prevent likely significant effects on flood risk and land drainage on land within and neighbouring the Project boundaries and states that mitigation proposals would be sympathetic to the existing drainage arrangements that serve the Biomedical Campus. Although the drainage design that has been developing since the TWAO submission, resulting in some minor changes to the drainage assumptions and solutions that the ES and FRA were based on, it is not considered that taking them into account would result in a change to any of the conclusions of the assessments presented in the ES of FRA, or any new or materially different significant effects.

3.16.2 In my view the conclusion in the ES that effects on the existing land drainage regime, which includes the UoC assets, are 'not significant' remains valid even when the conflict described above is taken into account.

4 OBJ08-W7– Proof of Rupert Thornely-Taylor (Noise and Vibration)

4.1 Para 1.8 - "*The ES did not consider all the potential effects of noise and vibration caused by the construction and operation of the proposed works on sensitive receptors in the AMB*"

Response of Simon Taylor (Noise)

4.1.1 The ES methodology for assessing potential effects was limited to determining broadly whether any significant effects were likely and did not specifically assess the effects upon research, including the effects upon animals. methodology for considering potential noise effects upon sensitive receptors within the AMB was provided in my proof of evidence (ENR4.2) paragraphs 10.3.5 to 10.3.29 and an assessment undertaken. The conclusion is that noise from the construction of the CSIE is not predicted to result in effects to sensitive receptors in the AMB. The ES did not therefore fail to report a likely significant effect of the CSIE Project.

4.2 Para 1.9 - "*The noise and vibration chapters of the ES lack sufficient information to enable other than a broad assessment to be made, with no clear indication of locations and durations of many construction activities*"

Response by Simon Taylor (Noise)

4.2.1 There is a temptation when producing construction noise assessments to try and provide a level of precision in the results that is beyond the level of certainty of the data. Final construction methodologies are not yet finalised. Specific plant items will be selected at a significantly later stage based upon availability. The ES was produced with the level of detail available at the time. This level of detail is considered to be typical for a TWAO. In order to mitigate against the uncertainty of the data available at the early stages, worst case assumptions were made in the ES calculations. These include highest noise levels selected from tables

in BS5228 for plant items (final selected plant are typically quieter), an assumption that plant operates non-stop (100% on-time) and that plant can operate at all locations across the site. Therefore whilst the assessment may be considered 'broad' by UoC, I am confident that it captures the potential worst case construction noise levels.

4.3 Para 1.14 - Is it practically possible to apply mitigation to comply with criteria?

Response by Simon Taylor (Noise)

4.3.1 The detailed approach to this mitigation is currently being developed by the contractor. The mitigation measures being considered by NR for this project are based upon tried and tested methods routinely implemented, and demonstrated to be effective, at sites close to receptors highly sensitive to noise. This includes solid 2.4m high site hoarding, localised mass barrier screens around noisy activities, choosing low noise versions of plant where feasible, fitting mufflers, selecting quieter techniques where feasible, switching off plant when not in use, and all of the other measures listed in the ES. I therefore have no doubt that it practically possible to apply mitigation to comfortably meet the UoC criterion at the AMB of 80dB$L_{Aeq,30mins}$.

4.3.2 It is demonstrated within my proof ENR4.2 paragraphs 10.3.5 to 10.3.29. that suitable mitigation will be applied to limit construction noise levels to a level where the criteria will be met.

4.3.3 In any event, no exceedances are expected to occur at the AMB from noise, even without any mitigation. The UoC proposed external façade noise limit of 80dBLAeq, 30mins will be met at all times, even if no mitigation (including BPM) is applied.

4.4 Paragraph 1.14 states, "*The proposed structure and details of a monitoring, warning and limitation protocol are not known*".

Response by Simon Taylor (Noise)

4.4.1 It is agreed such a protocol is required. The detail of this is being developed through Heads of Terms on the basis it will be secured through a legal agreement between Network Rail and UoC.

4.5 Para 4.18 construction noise levels are likely to be above threshold of hearing for zebra fish

Response by Simon Taylor (Noise)

4.5.1 The threshold of hearing is a very low noise level, significantly lower than ambient or background sounds; by definition the point that is a sound lower than any noise that can be heard. It is likely that fish can accept a significantly higher noise levels than this without adverse effects. After all, they are already subject to noise from many sources, including heating and ventilation system noise, pumps for the tanks which provide significant noise in the water, people moving around, opening doors, talking, etc all produce noise levels far in excess (orders of magnitude higher) of the predicted construction noise levels.

4.5.2 The threshold of hearing is understood to be frequency dependant, and 112dB at 250Hz. No clear evidence is provided in the proof as to how or why construction noise levels would exceed these levels within the tanks.

4.6 Para 4.18 *construction noise levels will be well above ambient noise levels*

Response by Simon Taylor (Noise)

4.6.1 The ambient noise level in the tanks is not known, but it can be expected to be significantly higher than the threshold of hearing for fish. Whilst I am not an expert in underwater acoustics, no evidence is provided as to why construction noise levels will be well above ambient noise levels.

4.7 Para 5.14 – "*noise levels should be maintained below 70dB SPL inside cages*"

Response by Simon Taylor (Noise)

4.7.1 This is significantly less onerous than our proposed criterion of 45 dBA and gives context to help demonstrate that the limit we are suggesting is very low in comparison to noise levels presented within the third party evidence attached to the UoC proof on noise.

4.8 Para 6.24 – *UoC's proposed 'adapted VC-A' vibration criterion addresses effects of underwater noise upon fish*

Response by Simon Taylor (Noise)

4.8.1 The UoC have suggested a vibration criterion for areas housing fish, of µ50 m/s RMS at all 1/3 octave band frequencies between 1Hz and 20KHz. The UoC state that if this criterion is met, underwater noise levels for zebra fish will be at an acceptable level. I agree that meeting the UoC proposed adapted VCA criteria would mean that underwater noise would be at a level at or below the threshold of hearing for fish. As such there would be no effects.

4.8.2 The threshold of hearing is a very strict test, and this means that noise levels would be limited to a level significantly lower than the ambient and background noise levels in the fish tanks. It is likely that fish can accept a significantly higher noise levels than this without effects. After all, they are already subject to noise from many sources, including heating and ventilation system noise, pumps for the tanks which provide significant noise in the water, people moving around, opening doors, talking, etc all produce noise levels far in excess (orders of magnitude higher) of the predicted construction noise levels.

4.8.3 Whilst we believe that higher noise levels would be acceptable to the fish, we understand that the adapted VC-A criteria will be achieved (refer to Lynden Spencer-Allen's proof NRE3.2 for details).

4.9 Para 7.1 *the building was constructed to a design that achieves acceptable conditions taking into account the existing sources and requirements.*

Response by Simon Taylor (Noise)

4.9.1 This is understood.

4.10 Para 7.12.1 Proposed criterion for human beings inside the building 45 $dBL_{Aeq,30minutes}$, resulting in an external façade limit of 80 $dBL_{Aeq,30minutes}$.

Response by Simon Taylor (Noise)

4.10.1 An internal noise limit for areas inside the building where people work of 45 $dBL_{Aeq,30minutes}$, and an external façade limit of 80 $dBL_{Aeq,30minutes}$ are considered appropriate and acceptable to NR.

4.11 Para 7.12.4 *noise limits for rodents set at 45 dB at ultrasound frequencies.*

Response by Simon Taylor (Noise)

4.11.1 I see no valid basis for this criterion. My proposed criterion of 45 dBA for rodents is based on Home Office guidance, which is considered to be best practice.

4.11.2 Guidance issued by the Home Office specifically uses A-weighting with qualifications that suggest that meeting a limit of 50dBA will result in acceptable noise levels for humans and animals. The guidance refers to ultrasound and the guidance limit is considered to protect animals from ultrasound as well as the frequencies within the human hearing range.. This is discussed in Appendix B of my proof ENR4.3.See Para 10.3.9 of my proof (NRE 4.2) and Appendix B of my proof (NRE4.3) for further details.

4.11.3 RTT introduces, within Appendix 3 of his proof, evidence from research "*Construction Noise Decreases Reproductive Efficiency in Mice Skye Rasmussen, Gary Glickman, Rada Norinsky, Fred W Quimby, and Ravi J Tolwani Vol 48, No 4 July 2009 Pages 363–370 Journal of the American Association for Laboratory Animal Science*". This evidence concludes

that "*…we predicted that continuous noise below 65 dBA would not have a negative effect. We established that noise should not exceed 75 dBA for 1 h and set a maximum noise allowance of 85 dBA*". This evidence provided by the UoC demonstrates that noise levels many orders of magnitude higher than our proposed internal criterion of 45 dBA are acceptable for areas housing animals for research, without leading to significant effects. It also clarifies that using an approach based on dBA is considered reasonable.

4.12 Para 7.15.1 *airborne noise may cause annoyance or disruption to people working.*

Response by Simon Taylor (Noise)

4.12.1 Airborne noise levels will not be at, or close to, a level where they could cause disruption or annoyance within the building. See paragraphs 10.3.8 to 10.3.9 of my proof. It should be noted that my assumption of a 35dB sound insulation performance for the existing façade is agreed by UoC. Noise levels will be significantly below the proposed 45 $dBL_{Aeq,30mins}$ at all times, even within the most impacted rooms, of the AMB.

4.13 Para 7.15.4 "*underwater noise will be way above the hearing thresholds of Zebrafish*"

Response by Simon Taylor (Noise)

4.13.1 Whilst I am not an underwater acoustics expert, I see no evidence of this within the UoC proof. Based on the evidence provided within the UoC proof the threshold of hearing for a zebra fish is 112 dB at 250Hz in water, which we agree with.

4.13.2 Construction noise has the potential to makes its way into the fish tanks firstly as vibration through the ground, then transferring into the building structure and then reradiating as noise within the fish tanks (if

they are coupled to the structure). The noise level in the water is related to the velocity of vibration in the structure.

4.13.3 The original building design is understood to be based on an adapted VC-A curve (50 µm/s rms (1sec) at all 3rd octave frequencies between 1Hz and 20kHz)). I understand that the intention is to meet VC-A and this by default will meet the adapted VC-A criterion. Please refer to the evidence of Lynden Spencer-Allen within his proof (ENR 3.2) for further detail.

4.14 Para 8.6 *the ES assessment does not explicitly consider the types of receptors at the AMB*.

Response by Simon Taylor (Noise)

4.14.1 It is agreed that the methodology used in the ES is of limited use when assessing impacts upon the AMB and research activities undertaken within. I therefore provide an additional assessment within my proof of evidence to supplement the work in the ES. (paragraphs 10.3.5 to 10.3.29). The results of that assessment are such that the ES did not omit any likely significant effects.

4.15 Para 8.10 "*The sound insulation of the external facade of the AMB was selected assuming the continuance of the current ambient noise climate, and the predicted exterior construction noise levels are substantially in excess of the pre-existing ambient so that noise criteria for internal spaces will be exceeded*"

Response by Simon Taylor (Noise)

4.15.1 It is demonstrated in my proof that criteria for internal spaces will not be exceeded. See paragraph 10.3.1 to 10.3.29.

4.16 Para 9.2 "*There is also no reason why the effect of basic mitigation measures such as noise barriers or selection of quieter plant cannot be addressed, taking*

account of the heights of each floor in the AMB and the different barrier attenuations which will result at each level."

Response by Simon Taylor (Noise)

4.16.1 Basic mitigation measures have been addressed. Solid site hoarding in combination with localised screening has always been proposed see ES Chapter 5 paras 5.44 to 5.46 and 5.51 and is further discussed in paras 10.3.1 to 10.3.29 of my proof. The ES states that mitigation will be employed in the form of Best Practicable Means (BPM). Further detail is provided in paragraphs 5.44 to 5.46 and 5.51 of the ES Chapter 5, the CoCP A, and paragraphs 10.3.1 to 10.3.3 my proof. Full details for mitigation to meet required noise limits should be agreed and included in the CoCP B.

4.17 Para 9.10 "*The Scheme as presented to the inquiry is stated to be likely to have significant effects on key research facilities including those at the AMB*"

Response by Simon Taylor (Noise)

4.17.1 I demonstrate why there will be no significant effects upon research from noise in my proof paragraphs 10.3.1 to 10.3.29

4.18 "*Network Rail's consultants have declined to carry out an assessment of underwater noise levels*"

Response by Simon Taylor (Noise)

4.18.1 This was investigated by Lynden Spencer Allen following a technical meeting with Rupert Thornley-Taylor to determine if carrying out such an assessment would provide useful insights. This review found that the information available on the onset of impact for fish from underwater noise was not well understood and any threshold levels given were accompanied by significant uncertainty. Given this and that the vibration

criteria for the building had been provided by UoC, carrying out this additional assessment was not considered to provide any further insight.

4.19 *Relevance of A-weighting to criteria for animals*.

Response by Simon Taylor (Noise)

4.19.1 Guidance issued by the Home Office specifically uses A-weighting with qualifications that suggest that meeting a limit of 50dBA will result in acceptable noise levels for humans and animals. The guidance refers to ultrasound and the guidance limit is considered to protect animals from ultrasound. This is discussed in Appendix B of my proof ENR4.3.

4.20 Operational Noise – additional switches and crossings

Response by Simon Taylor (Noise)

4.20.1 It is suggested in paragraphs 11.6 and 11.7 that additional switches and crossings have been introduced to the scheme since it was assessed for the ES and that these are closer to the AMB and could result in greater noise levels than those predicted within the ES. It has been confirmed by NR that whilst a small amount of temporary track will be installed it will have no additional points or crossings.

4.20.2 There are no switches and crossings on the temporary track and therefore noise from the temporary track therefore there is no reason to conclude that noise from the temporary track would be different in character to the main track, which is acceptable. It should be noted that noise from trains will be orders of magnitude below the level where effects are possible at the AMB.

4.21 Paragraph 1.8 states "*With regard to vibration, effects due to some of the likely sources associated with the Scheme were considered. Adequate mitigation to remove significant effects was not proposed in the ES.*"

Response by Lynden Spencer-Allen (Vibration)

4.21.1 The ES concluded that there would be no significant effects in the operational phase. Potential significant effect was predicted during some activities closest to the AMB during the construction phase. The ES set out mitigation to reduce the impact including the use of Best Practicable Means, further engagement with University of Cambridge, vibration monitoring within the AMB and with more detailed assessment and mitigation being provided as part of the Code of Construction Practice Part B. The ES therefore reported on the likely significant effects and measures that could be taken to mitigate effects as required.

4.21.2 An offer to engage with UoC to discuss the findings of the ES prior to its submission was not taken up by UoC and so the more onerous concerns set out by the University now had not been communicated to Network Rail at that point. Subsequent to the TWAO submission and submission of the UoC Statement of Case further engagement with UoC has provided more detailed information where it is currently available. There are limitations on the level of detail that can be provided before the contractor has developed their construction methodology. This is currently in progress with methodologies being developed to see that the AMB vibration levels are not exceeded.

4.22 Paragraph 1.9 includes the following statement "*The noise and vibration chapters of the ES lack sufficient information to enable other than a broad assessment to be made, with no clear indication of locations and durations of many construction activities. Some construction activities are specifically excluded from the assessment. With regard to the operational phase the ES explicitly excludes, for example, vibration from freight trains.*"

4.22.1 The ES identified the types of construction activity and the closest zones in which they would operate. This was based on the information

available at the time of the assessment and before a contractor was available to provide additional detail. As set out in my proof of evidence the assessments (both in the ES and the subsequent additional analysis provided to UoC) show that it is only construction works associated with the track immediately adjacent to the AMB that have a risk of exceedance using the parameters set out within BS5228. The duration of these works is expected to be short but before a contractor had developed their methodology being more precise about the length and timing of the works was not possible. Provision of this detailed information on construction methods and programme is secured through the Code of Construction Practice Part B in the ES and subsequently through the legal agreement that is being agreed between Network Rail and UoC.

4.22.2 In the operational phase Freight trains were excluded from the ES assessment on the basis that during the author's involvement in the vibration assessments of the AMB, UoC were aware that occasional exceedances of the MRI criteria occurred but that this was not a concern. UoC also advised in the initial ES consultation phase (See ES Table 6-1) that since completion of the building the sensitivity had not changed. Post TWAO submission the UoC Statement of Case set out that freight train pass-bys were also a concern. This post TWAO submission has been responded to, with evidence provided to demonstrate that freight train pass-bys do not have a significant adverse impact as well as passenger trains and this is included in my proof of evidence in Appendix B. The terms of the draft legal agreement between Network Rail and UoC secure the critical design aspects which mitigate any impact in this regard and no likely significant effects additional to those reported in the ES are therefore considered to arise.

4.23 Paragraph 1.14 -"*What is not known is whether it is practicably possible to apply mitigation methods in terms of control of methods of working, selection of machinery and use of mitigation measures including noise barriers so as to comply with acceptability criteria.*"

Response by Lynden Spencer-Allen (Vibration)

4.23.1 The detailed approach to this mitigation is currently being developed by the contractor and it is considered possible to construct the works without significant adverse effects. The impact on construction methodology and equipment that can be used in the area closest to the AMB is significant (in terms of the reduction in size of machinery and therefore the time to carry out the works) but these activities are being developed to be off the critical path and without impacting on the operational railway. This allows the time to carry out those works to achieve the limits and respond to real time vibration monitoring alerts by altering construction methodologies. The detail of this is currently being developed and Network Rail has offered a commitment to UoC to prepare the method statement and for this to be provided to and agreed with UoC. As above, the legal agreement is also proposed to include a commitment requiring Network Rail to limit vibration from construction activities to the agreed limit except where otherwise agreed, giving confidence that the outcome sought is secured.

4.24 "*In the event that there would be periods when those criteria could be exceeded, there is insufficient information to be able to predict when and for how long such exceedances may occur. The proposed structure and details of a monitoring, warning and limitation protocol are not known.*"

Response by Lynden Spencer-Allen (Vibration)

4.24.1 It is agreed such a protocol is required and the requirement for this was set out in the ES and included in my proof of evidence Appendix B. As set

out above the detail of this is being developed through Heads of Terms on the basis it will be secured through a legal agreement between Network Rail and UoC.

4.25 Paragraph 6.19 states that the criteria in the AMB were designed to the VC-A and VC-C criteria on the advice of Ramboll. However, this is not correct as the work undertaken by Ramboll was to carry out vibration surveys to report against the VC-A and VC-C criteria that had been set out by UoC at that time.

Response by Lynden Spencer-Allen (Vibration)

4.25.1 These paragraphs set out a revised criterion for the MRI which concludes that the baseline vibration levels from current freight trains is below the criterion. Rupert Thornely-Taylor's proof of evidence is the first time this revised criterion has been supplied to Network Rail. At most frequencies it is less onerous than VC-C but is more onerous than VC-C at 2.5Hz and 3.15Hz. Initial analysis of the baseline surveys for freight trains has shown that one of the existing measured freight trains would have caused an exceedance of this revised criterion as well as VC-C. It is therefore not considered the case that this modified criteria is always achieved in the building currently.

4.26 Paragraph 6.22 sets out a comparison between vibration levels in g and the VC-A criterion. "*The relationship between VC-A and values expressed in terms of g depends on the bandwidth of the vibration. Broadband vibration with amplitude just equal to VC-A at every frequency from 8Hz to 80Hz would amount to approximately 0.1g. Vibration at a single frequency at 8Hz just reaching VC-A would be 256 mg.*"

Response by Lynden Spencer-Allen (Vibration)

4.26.1 There appears to be an error in the conversion from VC-A to g in paragraph 6.22 as I calculate at 8Hz VC-A would be equivalent to 0.256mg (ie 1000 times lower) and between 8Hz and 80Hz the combined

amplitude would be 0.003g (ie 33 times lower). These values can be compared with the criterion reported in paragraph 5.14 of Mr Thornely-Taylor's proof which states that vibration levels should be maintained below 0.025g RMS. Comparing these alternative values to this 0.025g criterion shows that there is a significant margin between VC-A and the published vibration criterion in the paper quoted. This suggests that substantial exceedance of the VC-A criteria would be needed before the onset of a significant effect.

4.27 Paragraph 7.12 sets out the criteria Mr Thornely-Taylor considers is required to avoid significant effects. 7.12.2 and 7.12.3 concern vibration and both introduce changes to the criteria originally agreed with UoC as the basis for assessment.

Response by Lynden Spencer-Allen (Vibration)

4.27.1 The implications of this late change in requirements are currently being assessed. Subject to final validation it is expected that Network Rail will be able to agree to the criteria in 7.12.3 without amendment. The MRI criteria in 7.12.2 appears to be currently exceeded during freight train pass-bys and therefore requires further investigation before this can be agreed. I will provide a further update in due course.

4.28 Paragraphs 8.1 to 8.5 criticise the adequacy of the ES.

Response by Lynden Spencer-Allen (Vibration)

4.28.1 So far as vibration is concerned, I do not accept the criticisms for the reasons that I cover in my response to paragraphs 1.8 and 1.9, above. I address further particular alleged deficiencies raised in Rupert Taylor-Thornley's proof below.

4.29 Paragraph 8.11 States that "*The works proposed that would affect the AMB are unclear and contradictory.*"

Response by Lynden Spencer-Allen (Vibration)

4.29.1 This comment is based on vibratory piling being excluded in ES section but included in ES Appendix Table 6-2-5. As set out in my proof of evidence Appendix B this information was included to inform the potential impact of such activity and not to suggest that it was intended. This is made clear in Table 6-14 of the ES which states that vibratory piling would not be used.

4.30 Paragraph 8.13 sets out additional information required by UoC in respect of construction vibration.

Response by Lynden Spencer-Allen (Vibration)

4.30.1 As set out in my proof of evidence Appendix B the mainline tamper has not been assessed as it currently operates as part of the operational railway with no reported impacts on the operation of AMB.

4.31 Paragraph 8.14 sets out a perceived insufficient level of detail on the effect of the building on construction vibration.

Response by Lynden Spencer-Allen (Vibration)

4.31.1 This has been addressed in my proof of evidence Appendix B which sets out the approach used and provides additional information on the calculation methods applied.

4.32 Paragraph 8.15 sets out information required in relation to the assessment of propagation of vibration through the ground and into the building.

Response by Lynden Spencer-Allen (Vibration)

4.32.1 These matters have been addressed in my proof of evidence in Appendices B, C and D. It is denied that the further information now requested by UoC is required in order to appreciate the impacts of vibration on the AMB.

4.32.2 These technical notes provided to UoC during the post TWAO submission phase provide background information relating to the ground conditions and transfer functions from external to ground floor and ground floor to upper floors of the building. Site specific ground conditions as suggested by Mr Thornely-Taylor have not been used in conjunction with BS5228 as the method does not allow it and doing so would be very unusual. Using a ground propagation model with source construction vibration data from BS5228 would add additional uncertainty. This is because the vibration measured close to a construction source will include both body and surface waves and at the distance of the AMB only surface waves will be critical. There is not sufficient data relating to the vibration sources in BS5228 (frequency content and body vs surface wave magnitudes) to allow a decoupling of these effects meaning that approach cannot sensibly be used.

4.33 Paragraph 8.16 sets out that alternatives to vibratory piling have not been assessed.

Response by Lynden Spencer-Allen (Vibration)

4.33.1 Vibratory piling is not proposed and therefore does not need to be assessed; alternative methods (rotary bored/CFA piling) are included in the methodology and assessment in the ES Appendix (Table 6-2-5) and my proof of evidence Appendix B.

4.34 Paragraph 8.17 sets out information required by UoC.

Response by Lynden Spencer-Allen (Vibration)

4.34.1 As set out above in response to paragraph 1.14 this information is being developed and secured both through the Code of Construction Practice Part B and the proposed legal agreement between Network Rail and UoC.

4.35 Paragraph 8.18 sets out the need for a continuous vibration monitoring system.

Response by Lynden Spencer-Allen (Vibration)

4.35.1 This is already included as a BPM measure in the ES in section 6.4.6 with the details to be developed as part of the detailed construction methodology and within the Code of Construction Practice Part B as would be normal. Further detail on the system proposed was set out in my proof of evidence Appendix B. In addition to this Network Rail has offered a commitment to UoC to include a requirement for such a system in the proposed legal agreement. The details of the system are subject to agreement with UoC in advance.

4.36 Paragraph 8.19 sets out perceived issues relating to freight train assessments not being included in the ES for AMB.

Response by Lynden Spencer-Allen (Vibration)

4.36.1 The background to why freight trains were not assessed as part of the ES is set out in my rebuttal response to paragraph 1.9.

4.37 Paragraph 8.21 sets out the need for all combinations of train movements to be assessed.

Response by Lynden Spencer-Allen (Vibration)

4.37.1 The assessments set out in my proof of evidence in Appendix B demonstrate that the introduction of switches and crossings at the proposed location and with a 1200m radius should not cause vibration levels at the AMB to be higher than a train passing adjacent to AMB. This means that two trains passing simultaneously adjacent to the site, as can currently occur, will result in a higher vibration level than two trains passing over the S&C simultaneously and therefore the proposed scheme will not result in a significant difference from the current

operating conditions. No additional likely significant effects are therefore generated.

4.38 Paragraph 8.22 and sub paragraphs relate to the effect of speeds on the assessments.

Response by Lynden Spencer-Allen (Vibration)

4.38.1 These have been covered by the assessments included in my proof of evidence Appendix B in information provided to UoC post TWAO submission. The matter of the proportion of stopping and non-stopping trains is not considered to have a bearing on the conclusion of no likely significant effect. This is because the scheme is not intended to alter the type or number of trains that use the line but instead to provide a station for some of them to stop at. Given this the effect of the station will be to slow some trains from their current speed which will result in lower vibration levels than current. For this reason, this information has not been presented. The use of speed limits has not been investigated as the results show this is not required to avoid significant effects but would cause a problem for the operation of the railway as it would affect timetabling.

4.39 Paragraph 8.23 queries the location of predictions and whether they are within the building or external.

Response by Lynden Spencer-Allen (Vibration)

4.39.1 This has been covered in my proof of evidence Appendix B which has previously been issued to UoC.

4.40 Paragraph 8.26.1 states "*The prediction of vibration in Figures 6-38 and 6-39 of Appendix 6.3 may be exceeded when freight trains have been taken into account and the conclusions of "not significant" on page 6-21 of Chapter 6 does not take freight trains into account.*"

Response by Lynden Spencer-Allen (Vibration)

4.40.1 Freight trains have been assessed and found to not change the conclusion of no significant adverse effect as has been shown in my proof of evidence Appendix B which was submitted to UoC post TWAO submission.

4.41 Paragraph 8.26.2 states "*A full assessment of the option of installing swing-nose points and movable frogs should be carried out. Where there are site constraints the removal of those constraints should be fully considered.*"

Response by Lynden Spencer-Allen (Vibration)

4.41.1 The installation of swing nose points and movable frogs creates an operational complexity for Network Rail with non-standard components with very long lead times which is a major issue in the event of future replacement and maintenance. Given the assessment has shown that with the large radius switches and crossings there is no significant adverse impact predicted there is no need for swing nose crossings and movable frogs to be considered.

4.42 Paragraph 8.26.3 states "*In addition to joints, rail welds made using the aluminothermic process also have the effect of discontinuities because the metal used in the weld is softer than rail steel, and impulses occur when axles pass over them.*"

Response by Lynden Spencer-Allen (Vibration)

4.42.1 Network Rail have committed to not using aluminothermic welds on the rails near to the AMB, which is to be included in the draft legal agreement between Network Rail and UoC.

4.43 Paragraph 9.5 states "*Network Rail now consider that because there is an exceedance of the VC-C design criterion for the MRI instrument at the AMB due to the passage of freight trains, the fact that there will be an increase in that*

exceedance due to the revised track layout may be neglected and no proposals for mitigation are under consideration."

Response by Lynden Spencer-Allen (Vibration)

4.43.1 The analysis presented in my proof of evidence shows that the effect of the switches and crossings when placed as far from the AMB as proposed is that they do not cause vibration levels to increase above trains passing adjacent to the AMB as they currently do. There is therefore no requirement for further mitigation to the switches and crossings beyond the distance and 1200m radius crossings both of which are contained in the draft legal agreement between Network Rail and UoC.

4.43.2 Closer to the AMB there is a very small slewing of the track closer to the AMB which was addressed in my proof of evidence Appendix D. The very small move (0.8m) closer to the AMB is predicted to result in a change to vibration levels of less than 1% increase which is lower than the threshold that could be measured reliably. For context, discernible vibration impacts are normally brought about by a doubling of vibration levels rather than a marginal increase of 1%. There is not therefore predicted to be any significant change to the vibration levels from freight trains on the AMB due to the scheme. Since there are currently exceedances of the VC-C criterion which are not reported to be a problem for UoC and the scheme is not predicted to cause an increase in these levels there is no requirement for mitigation.

4.44 Paragraph 11.3 sets out that no assessment has been carried out of underwater noise levels for fish.

Response by Lynden Spencer-Allen (Vibration)

4.44.1 Following the technical meeting between Rupert Thornely-Taylor and the author this was investigated to determine if carrying out such an assessment would provide useful insights. This review found that the

information available on the onset of impact for fish from underwater noise was not well understood and any threshold levels given were accompanied by significant uncertainty. Given this and that the vibration criteria for the building had been provided by UoC and confirmed by them to still be their requirement, carrying out this additional assessment was not considered to provide any further insight.

4.45 Paragraphs 11.4 sets out that consideration of the road surfaces for construction vehicles is required.

Response by Lynden Spencer-Allen (Vibration)

4.45.1 This is assessed in the ES construction vibration assessment where 'Loaded Trucks' have been assessed and shown to not cause exceedances of the criteria within AMB. In addition, Network Rail have committed to the haul roads being asphalt surfaced which will mitigate any risk of degradation through the construction period and in line with Best Practicable Means.

4.46 Paragraphs 11.5 states "*An assessment of vibration from these construction activities not assessed in the ES is still awaited.*"

Response by Lynden Spencer-Allen (Vibration)

4.46.1 As set out in this proof rebuttal the level of detail requested is not currently available and commitment has been set out to providing this when it is available through the Code of Construction Practice part B and to be secured in a legal agreement between Network Rail and UoC.

4.47 Paragraph 11.8 sets out the need for the critical aspects of the assessment to be secured.

Response by Lynden Spencer-Allen (Vibration)

4.47.1 The terms of the legal agreement between Network Rail and UoC that is currently being negotiated includes commitment to the points raised in

this paragraph. In relation to the temporary track layout drawing referenced in this paragraph there is a misunderstanding of the intent. The drawing shows a temporary track alignment but this would be plain line and would not have switches and crossings on it and the effects stated would not arise.

4.48 Paragraph 11.9 sets out the need for the loop line 60mph limit to be secured.

Response by Lynden Spencer-Allen (Vibration)

4.48.1 The terms of the legal agreement between Network Rail and UoC that is currently being negotiated includes commitment to the points raised in this paragraph.

4.49 Paragraph 11.11 states that any increase in vibration from freight trains may be harmful to the operation of the MRI and refers to the vibration criteria set out in Appendix 1 of the proof.

Response by Lynden Spencer-Allen (Vibration)

4.49.1 It is noted that the proof introduces a new vibration criterion for the MRI to that which was agreed to be used as the basis of the assessment with UoC. The analysis carried out by Rupert Thornely-Taylor introduces new information not provided to the author before. However, the data presented in Appendix 1 of Mr Thornely-Taylor's proof shows that the predicted 1% increase in vibration due to the track slew is unlikely to cause an exceedance of the revised criteria.

4.50 Paragraph 12.1 sets out that Plot 9 will be subject to the same potential impacts as AMB.

Response by Lynden Spencer-Allen (Vibration)

4.50.1 The conclusions of the ES and my proof of evidence is that the proposed scheme has little or no impact on the existing vibration levels and no significant impact would be predicted for Plot 9 on this basis. It is also

noted that, as set out in Mr John Pearson's proof rebuttal, that the planning permission for Plot 9 has now expired.

5 OBJ08-W6 Proof of Paul Milliner (Planning)

5.1 Policy relating to the University and the Campus (Paragraphs 3.4 to 3.8)

Response by John Pearson (Planning)

5.1.1 NR note that the CCiC in their proof (OBJ-23-W1/1) do not identify either Policy 17 or Policy 43 as relevant policies. NR would concur with this assessment.

5.1.2 The CCiC Proof also sets out that the Cambridge South Infrastructure Enhancements scheme accords with the vision and strategic objectives of the Local Plan 2018 to promote sustainable economic growth, respond to climate change, and maximise sustainable transport modes, and in accordance with Local Plan policy 5 which supports implementation of the Peterborough Combined Authority Local Transport Plan (2020).

5.1.3 Further, Network Rail understand the importance of the CBC and the station is proposed to support its development as set out in Section 4.2 of the Planning Proof (NRE9.2) in particular with reference to Local Plan Policy 5, Connecting people: a strategic vision for rail published in 2017 (D63) and the Rail network enhancements pipeline (RNEP) (Autumn Scheme Updates 2019) (B43).

5.1.4 In conclusion NR recognise the importance of the CBC and the proposed station will support its further growth and development through securing a modal shift and the greater use of more sustainable forms of transport. In particular, by promoting sustainable transport and access for all to and from major employers, education and research clusters, hospitals, schools and colleges. This would include the CBC. Therefore as set out in NRE9.2 the CSIE does accord with the development plan.

5.2 No reference to paragraph 185 of the NPPF (Paragraph 3.14)

Response by John Pearson (Planning)

5.2.1 Section 4.9 of the Planning Proof (NRE9.2) addresses how the CSIE project accords with the development plan. The relevant development plan policies area assessed to comprise SCLP Policy SC/10 (Noise Pollution), Policy HQ/1 (Design Principles) and Policy 35 (Protection of human health and quality of life from noise and vibration) of the CLP. These policies cover the requirement covered in paragraph 185 of the NPPF.

5.2.2 As noted in Section 4.9 Network Rail are seeking to agree protective provisions through private agreements with the University of Cambridge in respect of the CSIE Project's potential impacts on sensitive scientific equipment. These will require Network Rail to agree relevant mitigation with the UoC. Noise and vibration are addressed in greater detail in the proofs of my colleagues Simon Taylor (on noise) (NRE4.2) and Lynden Spencer-Allen (on vibration) (NRE3.2), both of which reference the principle of agent of change in paragraph 187 of the NPPF.

5.3 Sustainable drainage (Paragraph 3.15)

Response by John Pearson (Planning)

5.3.1 Section 4.11 of the Planning Proof (NRE9.2) addresses how the CSIE Project accords with the development plan. The section concludes that 'Overall, given the commitment to provide further details through the proposed deemed planning conditions and that the FRA has no outstanding objections from either the LLFA or the EA it is considered that the CSIE Project is in accordance with the development plan with respect to CLP policies 31, 32 and SCLP policies CC/7, CC/8, CC/9.

5.3.2 Proposed planning conditions no. 15 provides that the surface water drainage strategy is to be in accordance with the sustainable drainage principles within section 6 of the Flood Risk Assessment.

5.4 National Planning Practice Guidance (NPPG) (Paragraph 3.17)

Response by John Pearson (Planning)

5.4.1 Section 4.9 of the Planning Proof (NRE9.2) addresses how the CSIE Project accords with the development plan.

5.4.2 It explains that adverse impacts from noise and vibration have been identified with respect to the AMB during construction. Network Rail propose to deals with these in two ways: via proposed condition 10, requiring it to submit a CoCP Part B, that will contain a number of detailed management plans including a Noise and Vibration Management Plan which will set out the proposed mitigation measures in line with Best Practicable Means ("BPM"), and via the conclusion of a private agreement with the University of Cambridge in respect of the CSIE Project's potential impacts on sensitive scientific equipment. This would require Network Rail to agree relevant mitigation with the UoC.

5.4.3 As a result, Network Rail have addressed the requirements of paragraph 003 of the NPPG. I note that the paragraph recognises that noise is a complex technical issue which may require specialist assistance. It is for that reason dealt with in further detail in my colleague Simon Taylor's proof of evidence (NRE4.2).

5.5 Guidance for the Natural Environment 2019 (Paragraph 3.18)

Response by John Pearson (Planning)

5.5.1 Section 4.11 of the Planning Proof (NRE9.2) addresses how the CSIE Project accords with the development plan. This includes reference to the fact that Network Rail have included a number of planning

conditions (Nos. 14 to 16) to ensure that the surface water drainage is designed and implemented, taking into account SuDS principles, to ensure there is no increase in flood risk. It is to be noted that the EA has withdrawn its objection to the Scheme.

5.5.2 Therefore, NR have taken into account SuDS and their drainage scheme will be in accordance with the Guidance for the Natural Environment 2019

5.6 Cambridge Local Plan (Paragraph 3.20 to 3.34)

Response by John Pearson (Planning)

5.6.1 Section 4 of the Planning Proof (NRE9.2) addresses how the CSIE project accords with the development plan. In particular sections 4.2 (principle of Development) 4.9 (Noise and Vibration) and 4.11 (Water Resources and Flood Risk).

5.6.2 Network Rail understand that there are some specific issues with respect to the AMB that would be more appropriately dealt with directly with the UoC through protective provisions or similar contained in a private agreement with the UoC which would enable NR to agree bespoke mitigation measures to safeguard the UoCs activities within the AMB.

5.7 Planning Conditions and Potential Mitigation (Paragraph 4.1 to 4.5)

Response by John Pearson (Planning)

5.7.1 Network Rail's application is equivalent to an outline application. The provision of conditions is an appropriate response in order to provide further information regarding the scheme. The CSIE Project was subject to a full Environmental Impact Assessment.

5.7.2 Network Rail understand that there are some specific issues with respect to the AMB that would be more appropriately dealt with directly with the UoC through a legal agreement with the UoC which would enable NR

to agree bespoke mitigation measures to safeguard the UoC's activities within the AMB.

5.7.3 With respect to Plot 9 as noted in Para 3.8 of UoC's compensation Proof (OBJ-08-W1) and Paragraph 2.12 of the UoC Planning Proof the UoC's Outline Planning Permission for the development of Plot 9 (application reference 16/1078/OUT) has now expired, as a funded building project did not materialise in time.

5.7.4 As a result, Network Rail would be happy to discuss with the UoC their plans for a future application for the development of Plot 9 so that proposals for both projects tie together in relation to drainage and other matters. This could be included in the proposed legal agreement between the parties.

5.8 University's Obligations in Relation to Extant Consent (Paragraphs 5.1 to 5.4)

Response by John Pearson (Planning)

5.8.1 Network Rail would propose to deal with this in the same or similar manner as with respect to the Western Boundary Planting and Strategic Gaps as relates to the ability of AstraZeneca to comply with their planning permission. This is described in paragraphs 7.2.12 and 7.2.13 of the Network Rail Planning Proof (NRE9.2).

6 OBJ-08-W4 – Proof of Karl Wilson

6.1 Paragraph 5.10 states "*The MRI equipment that was installed in the building, once operational, has manufacturer's stated limits (again, see the evidence of Rupert Thornely-Taylor). In summary these require operations at no more than a RMS (1 second) value of 12.5 µm/s in any third octave band centred on frequencies between 1Hz and 20kHz.*"

Response of Lynden Spencer-Allen (Vibration)

6.1.1 It is noted that the sensitivity of the MRI equipment stated here does not match that contained in Rupert Thornely-Taylor's evidence nor that which was previously agreed as the criterion with UoC. It is close to the VC-C criterion which was agreed as the basis for the ES with UoC in February 2021 (see ES Table 6.1) but the requirement for high frequency extension of the criterion was never set out. This point is addressed in more detail in the rebuttal response to Rupert Thornely-Taylor's proof of evidence.

6.2 Paragraph 6.3 *"I have significant concerns with the extent to which the proposals, including the supporting material in the Environmental Statement prepared for the Scheme ("ES")have attempted to properly understand the specialised nature of the important work carried on within the AMB in these respects. I explain these below, along with their potential implications, drawing on the background that I set out above. I also have concerns regarding electromagnetic interference ("EMI") in relation to imaging equipment however this will be addressed separately in evidence prepared by John McAuley."*

Response by Lewis Wingfield (Strategic Case)

6.2.1 Network Rail started engagement with the University of Cambridge alongside other campus stakeholders as summarised in Section 5 of the proof. Network Rail began more specific engagement in March 2020 when regular meetings with campus stakeholders were arranged to

discuss evolving proposals. This included a meeting with campus stakeholders setting out the proposals for station locations on 22 April 2020. This resulted in exchange of correspondence between Network Rail and University of Cambridge where UoC cited vibration as a potential issue, and where they expressed a preference for the Northern station location aligning with the option subsequently selected.

6.2.2 At this point the project was still in GRIP 2 (Feasibility) and the project team was informed by UoC of the vibration standards of the building. However we were advised that the specific technical report underpinning the UoC's vibration concerns could not be provided for security reasons. Network Rail acknowledged the importance of the work undertaken at the AMB at this time in feedback to the limited information provided and requested the technical report to allow for more detailed work.

6.2.3 The importance of the research undertaken at the AMB is not being challenged and we do not doubt the security concerns relied on by UoC, hence our attempts to engage with UoC on reaching Heads of Terms that give the organisations sufficient comfort that the scheme can progress without causing significant adverse effects upon the operation of the AMB.

<u>Response by Lynden Spencer-Allen (Vibration)</u>

6.2.4 In relation to vibration, as part of the ES, we established and agreed the vibration sensitivity of the AMB with UoC and established baseline vibration levels in the building. These have been used as the basis for the assessment of effects in the ES and also in subsequent discussions with UoC. The sensitivity and importance of the vibration levels of the building have therefore been accounted for in the assessments undertaken. My proof of evidence and rebuttals give further details of

this process and how these have informed the proposed legal agreement between Network Rail and UoC which will secure no significant adverse effects from the scheme.

Response of Rasheed Hameed (EMI)

6.2.5 From an EMC/EMI point of view the route already have been electrified since the eighties and there are no changes to the voltage, frequency or HV configuration system. Hence, we would like to understand the level of immunities that the equipment withing the AMB and we will implement all the necessary compliant mitigation measures to prevent any adverse operation issues due to EMI/EMC issues.

6.3 Paragraph 6.12 states "*The AMB has specialist working requirements in respect of environmental laboratory conditions, with an extremely narrow tolerance range beyond which research outcomes would be rendered unreliable.*"

Response by Lynden Spencer-Allen (Vibration)

6.3.1 It is acknowledged that there are specialist requirements for operation of the AMB and the criteria used in the ES are those agreed with UoC for the assessment (albeit UoC have now set out revised criteria in their proof of evidence which is commented on in the rebuttal response to Rupert Thornely-Taylor). It has been shown in the ES and subsequent material provided to UoC as set out in my proof that, except where there are current exceedances of the original MRI criteria due to freight trains, the operational vibration levels will be within those criteria. Network Rail have set out appropriate mitigation to avoid significant adverse effects and a legal agreement between Network Rail and UoC is being negotiated to secure its implementation.

6.3.2 For construction vibration it has been shown that the majority of works do not constitute a risk of exceedance of the vibration criteria with the

proposed mitigation. The closest track and overhead line works and haul road construction have been assessed to have a risk of marginal exceedance of the VC-A criterion on upper floors based on BS5228 methods. Network Rail's appointed contractor has been developing the construction methodology but the detail to refine the prediction methods has not been available to date. It is the intention to mitigate construction vibration to below the levels required by UoC and a legal agreement to secure this is being negotiated.

6.3.3 We do not dispute the importance of appropriate environmental conditions for the AMB. We note that the VC-A vibration level set out is based on this being included in the US National Institutes of Health guidance as set out in Karl Wilson's proof of evidence. Vibration criteria are not set out in any UK guidance nor code of practice.. The Home Office code of practice (Code of Practice for the Housing and Care of Animals Bred, Supplied or Used for Scientific Purposes, UK Government Home Office, 2014) does not refer to needing to comply with a specific vibration limit. It is agreed there is an impact on animals when there are elevated levels of vibration but the published papers report impacts at significantly higher levels than VC-A. The range between VC-A and the onset of published impacts is large and I am not aware of any evidence that shows that marginal exceedances of VC-A would cause disturbance to the animals. There are published papers (eg Strategy for Controlling Noise and Vibration During Renovation of an Animal Facility, Sobotka et al, Lab Animal, 2003) however that show that construction vibration levels exceeding VC-A were found to have no adverse effects on animals. In the case of the above paper, vibration levels more than double VC-A were used as a target limit and exceedances of that level occurred without any observed adverse effects on the animals.

6.3.4 However, Network Rail is prepared to commit to complying with the VC-A criterion during construction works in recognition of the concern from UoC that exceedance of this could be detrimental to the work being undertaken in the AMB.

6.4 Paragraph 6.12 *The AMB has specialist working requirements in respect of environmental laboratory conditions, with an extremely narrow tolerance range beyond which research outcomes would be rendered unreliable. As mentioned above, VC-A was adopted as a design specification of the building based on the successful operation of the previous research facilities. The University did not anticipate further railway-related development. The major concern of the University is the potential for impacts at both construction and operational phases to impact on the welfare of the animals but also the outcomes of the research work.*

Response by Lewis Wingfield (Strategic Case)

6.4.1 The relevance of this point is unclear. The rail network is subject to ongoing renewal and enhancement and at no point has any commitment or statement been made by Network Rail that no development was planned. A station at this site has been mooted for many years although the project was not progressed in its current form until early 2018. It is worth noting that the project's earlier stages (GRIP 1-3) were in part funded by Greater Cambridge Partnership, of which the University of Cambridge is a partner.

6.5 Paragraphs 6.12 to 6.31 – Concern that elevated noise and vibration levels will impact research, including the behaviour of animals.

Response by Lewis Wingfield (Strategic Case)

6.5.1 I believe that there is a misunderstanding about the magnitude of noise that will produced during construction. The noisiest works, i.e. breaking concrete for gantry foundations which will take no more than a couple

of days, are predicted to be at noise level at least 10 dB below the noise trigger suggested by RTT in his proof for the UoC. For the vast majority of the time noise levels will be even quieter. I demonstrate why there will be no impact from construction noise in my proof paragraph 10.3.5 to 10.3.39 (NRE4.2).

7 OBJ08-W2– Proof of Graham Hughes (Transport)

7.1 Paragraph 5.7.2 – haul roads and noise assessment

Response by Simon Taylor (Noise)

7.1.1 It has been confirmed by the team who prepared the ES noise chapter that haul roads were modelled within the CadnaA construction noise model using the BS5288 haul road method with a frequency of at least 50 vehicles a day. I have done my own calculation using the BS5288 haul road method and this results in a noise level of 54 dB_LAeq,30mins at 20m, ie the location of the facade. This is significantly below the existing ambient noise level and is therefore considered negligible.

7.2 *Paragraph 5.9 - Seeking confirmation that by the operational phase of the scheme, temporary compound land will have been returned to landowners*.

Response by Bill Simms (Property)

7.2.1 It is understood that Network Rail may need to continue using the temporary compound land for some time during the operational phase of the CSIE Project. Affected landowners will continue to be eligible to claim compensation for losses arising in respect of the land until it has been handed back to them.

7.3 Paragraph 5.7.1 of Mr Hughes' Proof of Evidence (W2-1), he suggests that Network Rail should have identified any alternatives that had been considered for the proposed access roads, haul roads and construction compounds currently identified and why those selected have been chosen.

Response by Andy Barnes (Scheme)

7.3.1 With regards to the identification of any alternatives that had been considered for the proposed access roads, haul roads and construction compounds, these points are addressed in the Proof of Evidence of Mr Andy Barnes (NRE1.2) in Section 7.16.

7.4 Paragraph 5.7.2 of Mr Hughes' Proof of Evidence (W2-1), he requests full details of how the haul roads and construction compounds will be constructed including materials used and any measures in the construction methodology to reduce impacts. To allow an evaluation of how noise and vibration may change over time during the construction period, he requests information on how those haul roads and construction compounds will be maintained in their original state, and this applies to the wider access network too.

Response by Andy Barnes (Scheme)

7.4.1 Network Rail's designs in support of the proposed TWAO, including its consideration of its likely approach to construction, were considered at an appropriate level of detail to identify and mitigate significant environmental effects including use of measures described in its draft Code of Construction Practice. Proposals were assessed on the basis of normal site measures for construction compounds and working areas including access for works of this nature. It is normal practice to strip topsoils, lay a separating membrane and place capping and sub-base materials to provide a working surface. Network Rail agrees on the point made about the consequences of poorly maintained routes. Such solutions do require upkeep as part of a well managed site and this would be reflected in the Code of Construction Practice. It would not be usual to have developed detailed construction planning proposals including forms of temporary access road or proposed management and maintenance measures until such time that a Main Works Contractor is appointed.

7.5 paragraph 5.7.3 of Mr Hughes' Proof of Evidence (W2-1), he expects that Network Rail will identify the extent of the area where construction vehicles could cause noise and vibration impacts on the AMB, and to survey the state of the roads in that area to create a baseline condition survey.

Response by Andy Barnes (Scheme)

7.5.1 It is my experience that a Network Rail Main Works Contractor would routinely undertake and agree schedules of condition with all affected landowners.

7.5.2 I also agree that it may be good practice in some circumstances to initiate repairs ahead of commencement of the work although this liability would stay with the asset owner. In this instance, this is not necessarily UoC who are not responsible for the roads within the CBC. This falls to CUH for Robinson Way and CBC Management Ltd for Francis Crick Avenue.

7.5.3 I am aware that Network Rail will be proposing a full condition survey of Robinson Way and Francis Crick Avenue prior to commencement of construction as part of our agreements with CUH and CBC Management Ltd respectively. Network Rail is also agreeing a maintenance contribution with both CUH and CBC Management Ltd to cover both the construction and operational phases of the scheme, in return for the contribution NR will be granted the rights of access we require over the two private roads.

7.5.4 It is my opinion that none of these aspects of construction management are matters for an Environmental Statement and worthy of a specific assessment. These are usual site measure and would be covered within a Code of Construction Practice.

7.6 Paragraph 5.7.4 of Mr Hughes' Proof of Evidence (W2-1), makes a similar point about haul roads and construction compounds. He expects a similar approach to that taken for local highways. He recognises that these will be created specifically for the works and so would expect to see details of how they will be constructed, and the materials used and a similar monitoring regime and

process for repair of any defects that occur, to be agreed by the University prior to works commencing.

Response by Andy Barnes (Scheme)

7.6.1 It is my view that information of this nature would not normally be available at the time of preparation of any Environmental Statement, nor would it be required for the purposes of such an Environmental Statement and nor would the impact of the materials used in haul road construction or the method of haul road construction be expressly assessed as in no circumstances for a project of this nature could it be a critical activity or issue. Mr. Hughes is describing good construction practice and I am informed that that there is a proposal for a monitoring and management regime for the construction activities in the vicinity of the AMB which covers the use of the haul road, this mostly relates to noise and vibration with trigger levels set to avoid disturbance to the day to day activities within the AMB.

7.6.2 It is my opinion that none of these aspects of construction management are matters for an Environmental Statement and would be covered within a Code of Construction Practice. There are no circumstances where I would anticipate that choice of haul road materials or of the plant used to place those materials would be a critical activity and would be used to influence an assessment of the impact of a haul road on the site.

7.7 Paragraph 5.7.5 of Mr Hughes' Proof of Evidence (W2-1), anticipates a detailed construction management plan that explains the types of vehicles that will be accessing the site, their weight, times of arrival and routing. He expects that this assessment would encourage use of smaller rather than larger vehicles.

Response by Andy Barnes (Scheme)

7.7.1 I agree with Mr Hughes' assessment that smaller rather than larger construction plant would be likely along HR 6. The design and its supporting outline construction methodology used to support the assessment of impact incorporated a range of likely construction plant suited to the relatively constrained characteristics of the site.

7.7.2 However, Mr. Hughes is describing a level of construction planning that is more advanced than that which is available or required to make an assessment of impact from the proposed work. It is normal that the kind of information suggested is part of detailed construction planning by Network Rail's Main Works Contractor within a normal suite of project planning documentation demanded by Network Rail Standards including its Principal Contractor Licencing Scheme.

7.7.3 It is my opinion that this aspect of construction management is not a matter for an Environmental Statement. Information of this nature would not normally be available at the time of preparation of any Environmental Statement and would be covered within a final Code of Construction Practice.