



The Sizewell C Project

9.11 Responses to the ExA's First Written Questions (ExQ1) Volume 3 - Appendices Part 5 of 7

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Department for
Communities and
Local Government



Department
for Environment
Food & Rural Affairs

Mr Phil Stride
Thames Water Utilities Limited
Thames Tideway Tunnel
The Point, 37 North Wharf Road
London
W2 1AF

Your Ref: 100-CO-PNS-PINSP-000001

12 September 2014

Dear Sir,

PLANNING ACT 2008: APPLICATION FOR THE PROPOSED THAMES WATER UTILITIES LIMITED (THAMES TIDEWAY TUNNEL) ORDER

1. We are directed by the Secretary of State for Communities and Local Government and the Secretary of State for Environment, Food and Rural Affairs (the "Secretaries of State") to advise you that consideration has been given to:

- the report of the Examining Authority ("the ExA"), who conducted an examination into the application ("the Application") made on 28 February 2013 by Thames Water Utilities Limited ("the Applicant") under section 37 of the Planning Act 2008 ("the 2008 Act") for a development consent order ("the Order") under the 2008 Act for the Thames Tideway Tunnel ("the proposed development"); and
- representations received by the ExA and the Secretaries of State and not withdrawn in respect of the Application including those received following the close of the examination.

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2. The examination of the Application by the ExA began on 12 September 2013 and was completed on 12 March 2014. The examination was conducted on the basis of written evidence submitted to the ExA and evidence submitted and discussed at 43 hearings held between 11 November 2013 and 21 February 2014 and set out at Annex A to this letter.
3. All paragraph references, unless otherwise stated, are to the ExA's report ("The Report") and are in the form, for example, "ER 1.0". References to requirements are to the requirements in Schedule 3 of the Order.
4. Article 2 of the Infrastructure Planning (Waste Water Transfer and Storage) Order 2012 ("the 2012 Order") amended sections 14 and 29 of the 2008 Act to classify the construction in England of infrastructure for the transfer or storage of waste water with an expected capacity for the storage of waste water exceeding 350,000 cubic metres, as a 'Nationally Significant Infrastructure Project' ("NSIP"). The Thames Tideway Tunnel meets the criteria for classification as a NSIP (ER 1.2-1.3) and development consent is required before the proposed development can be commenced.
5. The Order would grant development consent for the construction and operation of a wastewater transfer and storage tunnel, known as the Thames Tideway Tunnel, a number of connection tunnels and other associated development and ancillary works. The Order would authorise works at 24 sites in London along the route of the tunnel, including works to construct interception structures at 16 combined sewage overflows, as well as other associated development. The Order would also authorise the Applicant to acquire land compulsorily and to use land temporarily, for the purposes of the proposed development.
6. Enclosed with this letter is a copy of the Report. The ExA's conclusions on the issues raised during the examination, and the reasons for these, are set out at the end of the chapter where these issues are discussed. The ExA sets out its conclusions on the case for development and the reasons for these at ER 18.66-18.82. Its recommendation is at ER 21.7.

Summary of the ExA's Recommendation

7. The ExA recommended that the Secretaries of State make an Order granting development consent, in the form set out in appendix F of the Report.

Summary of the Secretaries of State's Decision

8. **The Secretaries of State have decided under section 114 of the 2008 Act to make, with modifications, an Order granting development consent for the authorised project and other powers as set out in the Order.** This letter is the statement of reasons for the Secretaries of State's decision for the purposes of section 116 of the 2008 Act and the statement for the purposes of regulation 23(2)(d) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 ("the 2009 Regulations"). The Secretaries of State can be assumed to agree with the conclusions of the ExA unless they have stated that they disagree.

9. The Secretary of State for Communities and Local Government has granted a certificate further to the provisions of sections 131 and 132 of the 2008 Act (as amended by the Growth and Infrastructure Act 2013) allowing the acquisition of open space land required for the proposed development without replacement (referred to further at paragraph 127).

Secretaries of State's consideration

10. The Secretaries of State have fully considered:

- the Report, including the ExA's conclusions on the impacts of the proposed development, noting in particular that the ExA's greatest concerns relate to the construction phase (ER 18.81);
- the local impact reports submitted by 13 London Boroughs and the Mayor of London listed at Annex B to this letter; and
- the environmental information, including the Environmental Statement (ES) dated January 2013 which was submitted with the Application, along with changes and updates to the ES submitted on 14 February 2014 and 11 March 2014.

11. The Secretaries of State have also taken account of the representations made known to them in respect of the Application and all other matters which they think are both important and relevant to their decision.

12. The Secretaries of State's consideration of these matters is set out in the following paragraphs. Their consideration of the representations received after the close of the examination (i.e. after 12 March 2014) is also set out below.

13. The Secretaries of State agree with the ExA that the ES complies with regulation 2(1) of the 2009 Regulations. Overall they are satisfied that sufficient information has been provided for them to assess the environmental impact of the proposed development.

Consideration of policy and legislation

14. The Report was prepared on the basis that the Secretaries of State's decision in relation to the Application is to be made under section 104 of the 2008 Act. The Secretaries of State agree with that approach. The Secretaries of State have considered the requirements in that section of the Act regarding the matters they must have regard to in deciding the Application.

15. The Secretaries of State agree with the ExA (ER 3.11) that the National Policy Statement for Waste Water ("the NPS") is the only National Policy Statement relevant to their decision on whether to grant the Order for the proposed development. The Secretaries of State have had regard to paragraph 2.6.34 of the NPS which requires them as decision makers to assess the Application for development consent on the basis that the national need for a Thames Tunnel has been demonstrated and that it is for the Applicant to justify the specific design and overall tunnel route that it is proposing.

16. The Secretaries of State are satisfied that the ExA has had full regard to the NPS in carrying out its examination and in reaching its findings and conclusions and making its recommendation.
17. With regard to the exceptions in section 104 sub-sections (4), (5) and (6) of the 2008 Act, the ExA considered (ER 21.6) whether deciding the Application in accordance with the NPS would: lead to the UK being in breach of any of its international obligations, including concerning protected sites and species or waste management, or be in breach of any duty imposed on the Secretaries of State by or under any enactment or be unlawful by virtue of any enactment. The ExA was not aware of any international obligations or other duties that would be breached if development consent were to be granted in accordance with the NPS by the Secretaries of State. Nor was the ExA aware of any other reasons why deciding to grant consent in this case in accordance with the NPS would be unlawful by virtue of any enactment. Having considered these matters, the Secretaries of State agree with these conclusions.
18. The Secretaries of State have had regard to their duties as decision-makers in exercising their functions. This includes the public sector equality duty set out in section 149 of the Equality Act 2010.
19. The Secretaries of State have also had regard to relevant legislation and policy, such as matters in the development plans for the London Boroughs and the London Plan, referred to by the ExA in the Report at ER 3.1-3.94 as well as policies listed elsewhere in the Report together with the following important and relevant policies:
- Noise Policy Statement for England; and
 - River Basin Management Plan for River Thames.
20. The Secretaries of State have also had regard to the following documents published since the close of the examination but have given them little weight for the purposes of their consideration of this Application:
- The Government response to the consultation on the review of the Nationally Significant Infrastructure Planning Regime (published April 2014)
 - London Infrastructure Plan 2050: A Consultation. Greater London Authority (July 2014)
 - Consultation on Amending the Water Industry (Specified Infrastructure Projects) (English Undertakers) Regulations 2013 (published July 2014)
 - New River Basin Planning Guidance for the period 2015 – 2021 (published July 2014)
 - Technical Consultation on Planning (published July 2014). (Amongst other things this consultation sets out proposals to streamline the consenting process for nationally significant infrastructure projects).

Other considerations

21. The Secretaries of State have had regard to the implications of the recent High Court decision of *Redhill Aerodrome Ltd v Secretary of State for Communities and Local Government and others*. They are satisfied that this judgment does not raise any new important and relevant matters which are sufficient to affect their decision in this case and that there is no need to refer back to interested parties. This has been reflected in paragraph 143 in the 'Case for Development' section of this letter.

Representations and correspondence since the close of the examination

22. The Secretaries of State have seen the following correspondence regarding consents and certificates granted to the Applicant (see paragraphs 123-134 of this letter): between the Department for Transport and the Applicant (dated 02/07/14), between the Department for Transport and Eversheds LLP on behalf of Transport for London (dated 02/07/14), between the Department for Culture, Media and Sport and British Telecommunications plc (dated 04/07/14), between the Department for Culture, Media and Sport and Vodafone Ltd (dated 04/07/14), between the Department for Culture, Media and Sport and the Applicant (dated 04/07/14), between the Applicant and the Department for Transport (dated 16/07/14), between British Telecommunications plc and the Applicant and the Department for Culture, Media and Sport (dated 18/07/14), between the Applicant and the Department for Culture, Media and Sport (dated 18/07/14), between Vodafone Ltd and the Applicant and the Department for Culture, Media and Sport (dated 18/07/14) and between Virgin Media and the Department for Culture, Media and Sport (dated 30/07/14). They consider that the matters raised in this correspondence are relevant but not important to their decision.
23. The Secretaries of State received representations after the close of the examination from: A. Rosenberg (dated 18/03/14), LB of Wandsworth (dated 19/03/14), the Applicant (dated 09/04/14 and 14/08/14), S. Lawes (dated 28/04/14), J. Ruddock MP (dated 29/04/14), D. Stewart (dated 09/06/14), M. Macleod MP (dated 16/06/14), G. Hands MP (dated 19/06/14), Pinsent Masons (for Cemex) (dated 27/06/14), D. Percival (dated 13/05/14 and 14/07/14), J & P Ahad (dated 28/07/14), A. Williams (dated 28/07/14), D. Morphet (dated 29/07/14), B. Osbourne (dated 29/07/14), Mayor of London (dated 30/07/14), Jones Day on behalf of Surrey Quays Ltd (dated 31/07/14), Councillor W. Harcourt of LB Hammersmith & Fulham (dated 04/08/14), Vodafone (dated 06/08/14), Eversheds on behalf of Transport for London (dated 14/08/14), British Telecommunications plc (dated 26/08/14) and K. Roll (dated 29/08/14).
24. Copies of these representations are available on request from the addresses at the foot of the first page of this letter. They are also available to view at:
<http://infrastructure.planningportal.gov.uk/projects/london/thames-tideway-tunnel/>
25. The Secretaries of State have considered these representations and find that with regard to the representations from S. Lawes, J. Ruddock MP, D. Stewart, M. Macleod MP, G. Hands MP, Pinsent Masons (for Cemex), J & P Ahad, A. Williams, Vodafone and the Applicant they represent information which is both important and relevant to their

decision (see section 104(2)(d) of the 2008 Act), though they do not affect the Ministers' decision on whether or not to grant development consent.

26. The important and relevant issues raised in the representations received after the close of the examination included the following matters:

Correspondence from the Applicant

27. The Applicant wrote to the Secretaries of State on 14 August 2014 to provide an update on an agreement with river regulators, on agreements with stakeholders, on changes required to protective provisions in the Order and to the deemed Marine Licence, and corrections needed to four plans which would need to be reflected in Schedule 2 to the Order. The Secretaries of State consider that although important and relevant to their decision they do not affect the decision whether or not to grant development consent. These are all minor, non-material, changes which only relate to the parties that the Applicant has been in discussion with and has reached agreement with. Since those parties are aware of the changes that are relevant to their interests and the Secretaries of State do not consider that there are any other interested parties who would be affected by these proposed changes they do not think that there is any need to refer back to interested parties on any of these. All of the changes sought in the 14 August letter have been accepted by the Secretaries of State and are reflected in the Order made.

Air Quality

28. The independent Deptford air quality surveys contained within representations from J. Ruddock MP / S. Lawes agree with the findings of the Applicant that Deptford's current air quality has pollutants in excess of EU targets. The Report states that the construction phase of the tunnel will add to pollution levels in Deptford (ER 5.14). The ExA conclude that this increase will not be substantial (ER 5.17) and the Secretaries of State agree with this and are content that the impact is acceptable.

Vibration effects on buildings

29. Representations from Mr D. Stewart and Ms M. MacLeod MP noted the concerns of the management of British Grove Studios regarding groundborne vibration from tunnelling close to the foundations of 20 British Grove potentially leading to ground settlement. The management were concerned that this could affect the structural integrity of the waterproof lining of the building's basement walls. The Secretaries of State note the likely incompleteness of the assessment of potential impacts on 20 British Grove (ER 12.126-12.127 and letter from Mr D. Stewart of 09/06/14) but consider that the potential for a significant adverse impact from vibration is outweighed by the unlikely nature of any structural damage and the existence of monitoring, remediation and compensation arrangements for any damage or disruption caused by settlement (ER 19.420 and Application documents APP191 and APP135).

Site specific concerns

30. Representations raised general concerns about the impact of construction of the proposed development at various work sites. The impacts of construction have been

examined in detail for each construction site and consideration of these matters can be found within the relevant sections of this letter.

31. Although both important and relevant, these matters do not raise any new issues and do not affect the decision of the Secretaries of State. Hence, they do not consider that it is necessary to consult interested parties on these matters.

Main issues in the examination

32. The Secretaries of State's conclusions in respect of the main issues in the examination are detailed in the paragraphs that follow.

Air Quality

33. The Secretaries of State are satisfied that all reasonable steps have been taken by the Applicant to control any odours that could arise from the construction and operation of the proposed development (ER 5.17). The Secretaries of State agree with the ExA's overall conclusions in respect of air quality considerations (which includes matters related to dust and odour) that the proposed development will not lead to any new breaches of national air quality limits or result in any substantial changes to air quality in the area (ER 5.17). In their consideration, as the anticipated impacts are minor they have not given them significant weight in reaching their decision, as recommended by the ExA (ER 5.18).

Biodiversity, biological environment and ecology

34. The Secretaries of State agree with the ExA's conclusions (ER 6.59) that the proposed development is unlikely to cause significant harm to nationally designated sites or any protected species. The Secretaries of State also agree that potential effects on aquatic ecology will be mitigated by provisions in the Deemed Marine Licence (ER 6.60). Protective provisions in Schedule 16 and requirements in Schedule 3 of the Order provide for mitigation for terrestrial sites. With regard to the permanent loss of aquatic habitat to accommodate acceptable structures, the Secretaries of State consider that the need to achieve acceptable design solutions in sensitive areas, such as an inter-tidal terrace, and the creation of an inter-tidal area at the River Wandle, will compensate for habitat loss (ER 6.62).
35. The ES identified no significant adverse effects in respect of the Sites of Interest for Nature Conservation at King George's Park, Falconbrook Pumping Station, Deptford Church Street, Beckton Sewage Treatment Works and Carnwath Road Riverside work sites. The Secretaries of State agree with the ExA's overall conclusion that the construction of the proposed development avoids significant harm to biodiversity in accordance with the NPS (ER 6.66) by the use of mitigation measures. The Secretaries of State note that the project will result in improved river water quality in the River Thames which will have beneficial effects on fish and on invertebrate density and abundance (ER 6.67).

36. Accordingly, in reaching their decision on the proposed development, the Secretaries of State attach significant weight to the benefits to aquatic ecology during the operational phase of the project, as recommended by the ExA (ER 18.70).
37. The detailed environmental examination required by the Conservation of Habitats and Species Regulations 2010 and the 2009 Regulations are dealt with at paragraphs 93-96 of this letter.

Coastal / River change

38. The Secretaries of State agree with the ExA's conclusions that the Applicant has carried out modelling to predict impacts on estuarine processes and brought forward satisfactory mitigation measures (ER 7.14-7.15). These mitigation measures include scour and accretion monitoring arrangements and trigger levels for remedial action in accordance with the requirements of the NPS, and they will be secured through the Four-Way Legal Agreement between the Applicant and the river regulators and through protective provisions and requirements in the Order and conditions on the Deemed Marine Licence (ER 7.16).
39. The Secretaries of State agree with the ExA's conclusion that the Deemed Marine Licence and protective provisions in the Order would provide appropriate controls in relation to works in the river and that coastal and river change is not a matter that should attract significant weight in the decision as to whether or not to make the Order (ER 18.12).

Design, landscape and visual impact

40. The Secretaries of State agree with the ExA that the parameter plans, indicative and illustrative drawings and design principles for the proposed development strike the right balance between certainty and flexibility and accept that the design detail will be appropriately controlled by requirements in the Order in accordance with the NPS (ER 8.83).
41. The Secretaries of State agree with the ExA's view that during construction the proposed development will have widespread significant adverse visual effects. They also agree with the ExA's conclusion that the Applicant has sought to minimise visual impacts through mitigation measures as required by the NPS but that, because of the scale and nature of the works, these could only partially mitigate the adverse effects (ER 8.84). As stated in the NPS and by the ExA, the Secretaries of State acknowledge that the construction of a major infrastructure project in a mature urban environment will have temporary adverse visual effects of this kind. The nature and extent of the impacts are weighed in the balance against the benefits of the proposed development in paragraphs 140-141 of this letter (see also ER 8.90).
42. With regard to the permanent works, the Secretaries of State agree with the ExA that the Applicant has described the approach to securing good design in the Design and Access Statement and they note that the design, including the common approach to street level features, has attracted support from the Historic Buildings and Monuments Commission

for England and the Design Council CABE. The Secretaries of State also agree that the Applicant has demonstrated good design in terms of siting relative to existing townscape character and vegetation, in accordance with the NPS (ER 8.85). They accept the ExA's view that those sites with indicative designs will contribute to making attractive, usable, durable and adaptable places in accordance with the NPS and note that there are safeguards in place for those that are still illustrative (ER 8.86).

43. The Secretaries of State note the significant adverse visual effects that have been identified at one site (Chelsea Embankment Foreshore) in respect of the permanent works, but they agree with the ExA that the adverse townscape effects at that site will be minimised through appropriate siting, design and landscaping, in accordance with the NPS (ER 8.87). The Secretaries of State do not consider that the adverse visual effects at Chelsea Embankment Foreshore outweigh the benefits of the proposed development (ER 8.88). They further agree with the ExA that elsewhere the evidence indicates that the townscape and visual impacts of the permanent works will be negligible or beneficial (ER 8.89).
44. The Secretaries of State also agree with the ExA that the Applicant has considered the functionality of the design and has addressed operational and safety matters as required by the NPS. The Secretaries of State therefore agree with the ExA's overall conclusion that, on balance, design, landscape and visual impact in relation to the permanent works are not matters that should attract significant weight in the decision as to whether or not to make the Order (ER 8.91 and 18.17).

Flood risk and climate change

45. The Secretaries of State agree with the ExA's assessment that the Applicant has taken into account the NPS requirements for flood risk management, that the Sequential and Exception Tests have been applied and met, and that the design of the proposed development has taken into account the potential impact of climate change (ER 9.25). The Secretaries of State also note that the ExA's assessment is agreed by the Environment Agency. The Applicant carried out a flood risk assessment for each site which was included with the Application. In response to the ExA's request the Applicant also prepared and submitted a flood defence assets interpretive report which addressed concerns in relation to the absence in the original Application of a project-wide risk assessment.
46. The Secretaries of State agree with the ExA that the site specific assessments adequately take account of local flood management policies. Whilst most sites in the proposed development are in flood zones 3a or 3b and at risk from flooding, the Secretaries of State agree with the ExA that the design of the above-ground infrastructure has properly taken into account the predicted flood levels and is resilient to flooding as required by the NPS (ER 9.26).
47. Having regard in particular to the Statements of Common Ground with the Environment Agency and Canal and Rivers Trust, requirements and the protective provisions for the Environment Agency in the Order, the Secretaries of State agree with the ExA's conclusion that the proposed development has properly taken into account flooding and

climate change and that this is not a matter that should attract significant weight in the decision as to whether or not to make the Order (ER 18.18).

Historic environment

48. The Secretaries of State agree with the ExA that there will be no significant harm to archaeological assets and that the proposed mitigation measures through the Overarching Archaeological Written Scheme of Investigation to record any findings during construction and the various Site-Specific Archaeological Written Schemes of Investigation for approval by the relevant local planning authority would be an appropriate and practical response to the particular circumstances of this proposed development (ER 10.23). In reaching their conclusion the Secretaries of State have had particular regard to the Historic Buildings and Monuments Commission for England's agreement to the procedures (ER 10.135).
49. The Secretaries of State note the predicted effect on heritage assets through settlement resulting from shaft excavation and tunnelling at some locations, but agree with the ExA that having regard to the mitigation proposed through the Code of Construction Practice as secured by requirement PW6 in the Order, it is unlikely that these operations would cause material harm to the significance of the heritage assets (ER 10.136).
50. The Secretaries of State agree that there would be widespread adverse effects to the settings of the heritage assets during the construction phase, including to conservation areas and to designated heritage assets of the highest significance. The Secretaries of State further agree that the effects on the setting of heritage assets during the construction phase are minor to moderate adverse and in NPS terms less than substantial (ER 10.138-10.139). The Secretaries of State agree with the ExA that the existence of the legal agreements between the Applicant and the Diocese of Southwark means that mitigation measures have been adequately secured (ER 10.140).
51. As regards the permanent physical effects on above ground heritage assets, and on their setting, the Secretaries of State agree with the ExA that there will be changes to the historic environment in London with residual impacts remaining after mitigation (ER 10.141). Where adverse effects are predicted, for instance to a conservation area, a heritage asset or their setting, the Secretaries of State agree that the approach in the Order and the site-specific requirements for approval of works to designated heritage assets and protective works during construction and the design proposals for the proposed development, will offer significant mitigation (ER 10.129-10.130 and 10.143). The Secretaries of State therefore consider that the residual adverse effects will not amount to substantial harm to or loss of the significance of a listed building, a conservation area or a registered park and garden. This includes the historical significance of Sir Joseph Bazalgette's river wall and its group value when taken together with other elements of his original sewerage system at various sites, including at Victoria Embankment Foreshore (ER 10.92). The Secretaries of State agree with the ExA that there would not be substantial harm to the significance of the Palace of Westminster World Heritage Site or the Tower of London World Heritage Site (ER 10.144 and 18.20).

52. The Secretaries of State have had regard to the statutory duties in the Infrastructure Planning (Decisions) Regulations 2010 and the presumption in favour of the conservation of designated heritage assets and requirement for clear and convincing justification for any such loss in paragraph 4.10.13 of the NPS. The Secretaries of State therefore have given considerable importance and weight to the desirability of preserving affected heritage assets or their setting. In weighing the harm against the public benefit of the development, they have recognised that the greater the harm the greater the justification needed. The Secretaries of State agree with the ExA that the harm in relation to heritage assets is a matter which weighs against making the Order (ER 18.21).

Land use, including regeneration and open space

53. The Secretaries of State agree with the ExA's overall assessment of the proposed development's use of previously developed land and also agree that the Applicant has sought to minimise the use of land that has not been previously developed (ER 11.111).

54. The Secretaries of State agree that proposed works at Barn Elms and King George's Park would amount to inappropriate development in Metropolitan Open Land. In line with policy 7.17 of the London Plan, the strongest protection should be given to London's Metropolitan Open Land and inappropriate development refused, except in very special circumstances, giving the same level of protection as in the Green Belt. The Secretaries of State agree with the ExA that the degree of harm to openness at Barn Elms and King George's Park is relatively minor. However, in line with the NPS they attach substantial weight to this harm (ER 11.112). The Secretaries of State also agree that inappropriate development in Metropolitan Open Land is a matter that weighs significantly against making the Order (ER 11.120 and 18.71) and assess whether very special circumstances exist to justify this development at paragraph 143 of this letter.

55. The Secretaries of State give particular consideration to the likely impact of construction at Deptford Church Street and King Edward Memorial Park and agree with the ExA that the use of these spaces during construction, albeit temporary, would be a serious loss to these communities (ER 11.115) and is an important factor weighing against making the Order (ER 18.25). The Secretaries of State agree with the conclusions of the ExA (ER 20.242) suggesting the addition of requirement KEMPF18 to the Order to restrict Saturday morning working at King Edward Memorial Park in recognition of the particular circumstances of this being an area deficient in open space (ER 11.43), the importance to the local community and that Saturday mornings are times that the park is likely to be well used. This respite is agreed to be a valuable element in the overall mitigation strategy (ER 11.55-11.56).

56. The Secretaries of State agree that the addition of new public realm and public open space at a number of sites would be a benefit that weighs significantly in favour of making the Order (ER 11.120 and 18.70).

57. The Secretaries of State agree with the findings and conclusions of the ExA on Safeguarding Wharves and the potential effects on planned regeneration (ER 11.73-11.78). They also agree that although some development would be precluded or

delayed by the proposed development, including some affordable housing, there is no evidence this would have a significant impact on strategic housing delivery (ER 11.118-11.119 and 18.27) and this should not attract significant weight against making the Order (ER 18.67).

Noise and disturbance

58. The Secretaries of State agree with the ExA's overall conclusion (ER 18.30) that noise and disturbance impacts during the construction of the proposed development weigh against consenting to the development. This is on the basis of the impacts from construction noise and vibration that would be experienced by local communities from a proposed development of this nature and scale. It also takes into account that some of the noise and disturbance aspects of the environmental impact assessment were not as comprehensive as desirable (notwithstanding the overall adequacy of the ES).
59. With regard to the available information on noise impacts, the Secretaries of State note and agree with the ExA's findings that noise impacts on external living spaces such as gardens have not fully been taken into account, that a revised assessment of waterborne noise impacts on houseboats was lacking by the close of the examination period (ER 12.342), and that noise impacts at King Edward Memorial Park (ER 12.176) and on the upper floors of a new development at Chambers Wharf (ER 12.146) may have been understated. The Secretaries of State also note the likely incompleteness of the assessment of groundborne vibration impacts on 20 British Grove and the recording studio equipment within the property (ER 12.126-12.127 and post-examination correspondence received from British Grove Studios referred to in paragraph 29 of this letter). These factors all add to the Secretaries of State's view that noise and disturbance impacts associated with the construction of the proposed development weigh against consenting to the development.
60. The Secretaries of State agree with the ExA about the need for further baseline ambient noise monitoring (ER 12.295-12.296) and note the Applicant's commitments in this respect in the relevant Code of Construction Practice Part B for some sites. The Secretaries of State are content with the wording recommended by the ExA in requirement PW19 in the Order and would encourage the parties to ensure that the agreed ambient noise monitoring arrangements are practicable.
61. With regard to the noise mitigation within the Applicant's proposals, the Secretaries of State agree with the ExA that these consist of the on-site noise mitigation offered by the Applicant in the Code of Construction Practice parts A and B and the requirement in the Order which secures compliance with the Code of Construction Practice (PW6) and the Applicant's non-statutory off-site mitigation and compensation policy, which the Secretaries of State agree will be secured through a unilateral undertaking required by article 60 of the Order to be in place before development commences. When local authorities decide applications for consent under section 61 of the Control of Pollution Act 1974 it is possible for them to attach conditions to the consent which limit or qualify the consent and/or limit its duration.

62. The Secretaries of State agree that a restriction on Saturday working at King Edward Memorial Park Foreshore, secured through a site-specific requirement in the Order (KEMPF18) is an appropriate addition to the overall approach to mitigation given the particular circumstances at this site, which are set out at paragraph 55 of this letter. The Secretaries of State agree that similar restrictions are not required at other sites due to the nature of the affected receptors and given the existing restrictions set out in the Code of Construction Practice (secured by requirement PW6 in the Order) including restrictions on the types of activities that can take place on Saturdays and on heavy goods vehicle movements.
63. The Secretaries of State are of the view that setting noise limits can sometimes be appropriate but note that suitable project-wide or site-specific noise limits were not before the ExA at the conclusion of the examination (ER 12.259). The Secretaries of State consider that more effective protection would be afforded to the local community if noise limits were agreed, where appropriate, when the project is at a later stage when there is more certainty about the noise impact likely to be caused. The Secretaries of State note that the section 61 Control of Pollution Act 1974 consent process provides a mechanism for noise limits to be secured. Any noise limits agreed would need to be practicable and be consistent with the types of limit previously set for major construction projects in London. The Secretaries of State agree with the ExA that vibration limits are not required in the Order, for the reasons they set out (ER 12.262).
64. The Secretaries of State note that the trigger levels for noise insulation follow the informative guidance in the relevant British Standard. The Secretaries of State agree that the Order needs to provide for lower than otherwise trigger values for temporary rehousing for residential properties where noise insulation cannot reasonably be installed to bring it in line with the Applicant's revised off-site mitigation policy (Application document APP 210.01) as recommended by the ExA (ER 12.307 and 20.217). The Secretaries of State agree with the wording put forward by the ExA in requirement PW17 of the Order in this regard.
65. The Secretaries of State have inserted new wording in the Order to clarify that the time limits for trigger values for airborne noise also apply to trigger values for temporary rehousing, as per paragraph 4.2.6 of the Applicant's revised off-site mitigation policy (Application document APP 210.01).
66. The Secretaries of State note that the ExA amended requirement PW17 of the Order to refer to construction noise levels being monitored (where appropriate) from eligible façades with windows to 'habitable rooms'. The Secretaries of State further note the definition of habitable rooms contained in the Building Regulations Approved Document F: Ventilation 2010 Edition (as amended 2013). The Secretaries of State consider that this Building Regulations definition is similar to definitions used in the Noise Insulation Regulations 1975 (as amended) and the The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 (as amended), to which the Applicant's revised off-site mitigation policy refers, and that it provides helpful clarity that multi-purpose rooms such as kitchen-diners and studio rooms are within scope of the definition of a habitable room. The Secretaries of State consider that this definition is proportionate and takes account of modern living patterns on the one hand but also

reflects that certain types of rooms (for example those solely used as a utility or bath room) have traditionally been regarded as much less noise-sensitive environments. The Secretaries of State have therefore added additional wording to requirement PW17 in the Order to clarify the definition of habitable rooms accordingly.

67. The Secretaries of State agree with the additional wording included by the ExA in requirement PW17 to reflect the Applicant's revised off-site mitigation policy (Application document APP 210.01) which states that houseboats located by Putney Embankment Foreshore, Kirtling Street/Heathwall pumping station and Chambers Wharf will be treated differently with respect to trigger values for off-site mitigation eligibility. The Secretaries of State have added to this to ensure that trigger values for temporary rehousing where noise insulation cannot reasonably be installed in houseboats, shall be the same as the trigger values for noise insulation, mirroring the approach taken with other residential properties.
68. With the amendments to the Order made by the ExA and the further changes made by the Secretaries of State as outlined above, the Secretaries of State are satisfied that the mitigation is acceptable in accordance with paragraph 4.9.11 of the NPS.
69. With regard to the NPS aims in paragraph 4.9.9 relating to noise, the Secretaries of State disagree with the ExA's assessment (ER 12.357) that the proposal has not met the first NPS aim of avoiding significant adverse impacts on health and quality of life from noise. The Secretaries of State recognise how the ExA came to their view that there was not compliance with the first aim given their opinion (set out in ER 12.329-12.334 and 12.348) on the way in which the requirements of the NPS should be considered by decision-makers, but the Secretaries of State disagree with that view.
70. The Secretaries of State consider that the three NPS aims at paragraph 4.9.9 should be considered only after the full impact of the proposed development, including any on-site and off-site mitigation, has been taken into account. From the context of paragraph 4.9.13 it is clear that off-site mitigation is part of the means available to an Applicant to manage the noise impacts including cases where noise impacts are of such a magnitude that they necessitate compulsory purchase in order to gain consent for what might otherwise be unacceptable development.
71. In relation to whether the proposed development therefore meets the first of the NPS aims at paragraph 4.9.9. (i.e. avoid significant adverse impacts on health and quality of life), the Secretaries of State note the Applicant's commitment to develop Trigger Action Plans for premises which would be expected to experience significant adverse impacts and the commitment to offer noise insulation and/or temporary re-housing if trigger levels are exceeded. They further note the commitment for lower trigger values for temporary rehousing in certain special cases such as for night-shift workers, vulnerable persons and relating to certain community facilities. Where noise insulation is not feasible the trigger value for temporary rehousing will be set at the same level as for noise insulation. The Secretaries of State are content that the trigger levels as specified in requirement PW17 of the Order as revised are appropriate.

72. The Secretaries of State therefore consider the Applicant's proposals have succeeded in avoiding significant adverse impacts on health or quality of life as a result of the proposed development.
73. In reaching this view the Secretaries of State have considered wider Government policy on noise. The National Planning Policy Framework, the National Planning Practice Guidance on noise and the Noise Policy Statement for England are all clear that noise management should be determined in the context of sustainable development including the environmental, economic and social benefits of the proposal.
74. Therefore, notwithstanding their concerns about the incompleteness of the noise and disturbance assessment noted in paragraph 59, the Secretaries of State:
- Disagree with the ExA's views and consider that the proposed development meets the first NPS aim of avoiding significant adverse impacts on health and quality of life (ER 12.357);
 - Agree with the ExA's assessment (ER 12.357) that the proposed development meets the second NPS aim of mitigating and minimising adverse impacts on health and quality of life (NPS paragraph 4.9.9);
 - Agree with the ExA's assessment (ER 12.357) that the proposal meets the third NPS aim of contributing to improvements to health and quality of life through effective management and control of noise where possible (NPS paragraph 4.9.9);
 - Agree with the ExA's finding that, even with the wide range of mitigation secured the proposed development would result in noise and vibration impacts at many work sites during the construction phase (affecting mainly residential premises but also non-residential premises, public open space and amenities (ER 12.178)), which are undesirable. These impacts are a matter that weighs against consenting to the development and the Secretaries of State have taken this into account in their overall consideration of the Application in paragraphs 145-151.
75. Despite the difference of approach between the Secretaries of State and the ExA the two approaches both lead to the same conclusion that the Order should be made. On the basis of what is secured in the Order and otherwise proposed by the Applicant and the information available to them, the Secretaries of State's view is that the residual adverse impacts will not be significant. The ExA's view is that although the impacts are significant, the Order can be made notwithstanding non-compliance with the first bullet point of NPS paragraph 4.9.9, because the off-site mitigation does much to mitigate these and the matters weighing in favour of making the Order outweigh the matters weighing against.
76. The Secretaries of State consider the effect of residual noise impacts on the ability to satisfy the NPS aim on socio-economic factors at paragraph 79 of this letter.

Socio-economic effects

77. The Secretaries of State agree with the ExA that there will be displacement of business and amenity impacts on businesses at some of the sites affected by the proposed development (ER 13.19 and 13.25) and note that the statutory compensation will provide mitigation (ER 13.26). The Secretaries of State accept that these impacts will cause some adverse impacts on employment. However, they consider that the proposed development will also create an increase in employment opportunities and that this would be a significant socio-economic benefit (ER 13.83). Overall, the Secretaries of State consider that the contribution to the economy of the proposed development to be a major benefit at the project-wide level.
78. The Secretaries of State agree with the ExA's conclusion that both the ES and the Health Impact Assessment understate the likely effects on amenity and quality of life at some of the sites and that there would be some adverse effects on amenity in relation to schools, open spaces, businesses and community facilities (ER 13.83-13.86). The importance of this to the consideration of the drive site strategy is set out in the rationale for the selection of work sites section of this letter.
79. The ExA considered that there were gaps in the proposed mitigation for the impacts of noise and that because construction noise is an important component of the assessments in relation to amenity, health and well-being, they cannot be satisfied that the package of mitigation put forward by the Applicant in respect of these matters is satisfactory (ER 13.88). Nevertheless, with the changes to the Order the ExA put forward they ultimately concluded that the mitigation package was adequate to meet the noise mitigation requirements of the NPS (ER 12.353). With the further amendments to the Order proposed by the Secretaries of State (see paragraphs 152-160), and for the reasons set out in paragraph 61-74 of this letter, the Secretaries of State have concluded that the noise mitigation measures secured are adequate.
80. Accordingly, and in considering paragraph 4.15.12 of the NPS, the Secretaries of State are of the opinion that the overall package of mitigation measures relevant to amenity, health and well-being (air quality, traffic, visual impacts and loss of open space, as well as noise) is acceptable.
81. In reaching their conclusion the Secretaries of State have considered the Applicant's equality impact assessment. It is considered that the Application meets the requirements of the NPS in this regard.

Traffic, travel and transportation

82. The Secretaries of State agree with the ExA that the proposed development will substantially comply with the transport policies set out in the NPS, which require the consideration and mitigation of transport impacts. They note that the Application was accompanied by a Transport Assessment and Transport Strategy, which was retitled the River Transport Strategy during the examination. This will ensure that the majority of the excavated material arising from construction of the main tunnel will be transported by river, as will most other bulk construction materials required and arising at sites adjoining

the river. The Secretaries of State also agree with the ExA that requirements in the Order will generally ensure that during construction appropriate measures are taken to regulate traffic generated at each construction site and avoid unacceptable impacts on the highway network (ER 14.33).

83. The Secretaries of State note that the Applicant had proposed to replace the London Permit Scheme, which provides for the co-ordination of works carried out by utility companies and others affecting the highway in Greater London, with a bespoke scheme during the development period. However, at the close of the examination, agreement had not been reached between the Applicant and some of the highway authorities involved on the terms of a revised scheme. The Secretaries of State did not receive details of an agreed bespoke scheme before reaching their decision. They note the Applicant's concerns about the potential impact of the London Permit Scheme on the timely completion of the proposed development and the applicability of the scheme for a project of this size. However, the Secretaries of State agree with the ExA that the London Permit Scheme is an established successful scheme and that the risk of any delays as a result of the scheme is small (ER 14.20-14.21). They also consider that it would still be open to the Applicant to seek agreement on a bespoke scheme after the Order is made and seek a change to the made Order if necessary.
84. In the absence of an agreed alternative, on the basis of the information available to them the Secretaries of State therefore agree with the ExA's recommendation that the Order should be modified to maintain the London Permit Scheme (ER 14.34).
85. The Secretaries of State agree with the ExA that, overall, the proposed development could give rise to a range of impacts on London's transport infrastructure during the construction phase of the project and note that it is generally accepted that the effects during the operational phase would not be significant. They also agree with the ExA that the proposal to use river transport will reduce the impacts on the highway network and that the evidence indicates that other impacts could be sufficiently and appropriately mitigated, which would be secured by requirements and other measures (ER 14.35 and 18.39).
86. With regard to the River Transport Strategy, the Secretaries of State agree with the ExA's recommendation that requirement PW15 in the Order should be corrected to provide for the fill material used to construct the cofferdam at Chambers Wharf to be transported by river (ER 14.11).
87. The Secretaries of State therefore agree with the ExA's conclusion that the proposed development will not result in any residual effects on the surrounding transport infrastructure in such a way that they should attract more than limited weight (ER 14.36 and 18.40).

Water quality and resources

88. The Secretaries of State agree with the ExA's conclusion (ER 15.29) that the Application meets the requirements of the Water Framework Directive as set out in the NPS. The

Secretaries of State consider that the Applicant has also had regard to the aims of the River Basin Management Plan for the River Thames.

89. The Secretaries of State agree with the ExA's conclusion (ER 15.30) that adverse impacts will be mitigated and on that basis have concluded that no further requirements are needed. In reaching this view the Secretaries of State have in particular had regard to the Updated Statement of Common Ground between the Applicant and the Environment Agency (Application document APP215.03) and the protective provisions and requirements in the Order, such as requirement PW13.
90. The ES identifies significant beneficial effects on surface water quality during the operational phase of the project and the resultant contribution towards meeting the EU Urban Waste Water Treatment Directive and the Water Framework Directives. The Secretaries of State therefore agree with the ExA's conclusion (ER 18.41) that the beneficial effects are a key consideration weighing in favour of making the Order.

Other matters

Environmental statement and environmental impact assessment

91. The Secretaries of State note the submissions made by interested parties about the adequacy of the environmental information and the ExA's conclusions on some of the impacts identified in the ES (ER 16.22-16.34). The Secretaries of State agree with the ExA that these matters do not mean that the ES is inadequate (ER 16.29-16.34) and they consider that the ES complies with the 2009 Regulations.
92. The ExA's conclusions on some of the impacts identified in the ES are addressed elsewhere in this letter, including the sections on air quality (paragraph 33), noise and disturbance (paragraphs 58-76), traffic, travel and transportation (paragraphs 82-87) and the rationale for the selection of work sites and drive strategies (paragraphs 105-122).

Habitats Regulations Assessment

93. The Applicant undertook a project level assessment in relation to the Conservation of Species and Habitats Regulations 2010 which resulted in a Habitats Regulations Assessment: No Significant Effects Report (dated January 2013) being submitted with the Application (ER 16.38-16.39 and 16.62). Furthermore, information was supplied by the Applicant and other parties in response to ExA questions and the consultation on the Report on the Implications for European Sites (dated 21 January 2014) (ER 16.40-16.59). The Secretaries of State agree with ExA that the Applicant has complied with the above Regulations and the advice reflected in the NPS (ER16.69).
94. The Secretaries of State, as the Competent Authority for the purposes of the Conservation of Species and Habitats Regulations 2010, have had full regard to the contents of the Applicant's No Significant Effects Report, the Environmental Statement as defined at the close of examination and in the Applicant's draft Order, Statements of Common Ground between the Applicant and Natural England, the Marine Management Organisation, the Environment Agency and the Port of London Authority, and the

Applicant's Route map to Mitigation, alongside the Report on the Implications for European Sites published by the ExA and the representations of the Interested Parties in relation to the implications of the proposed application project for European sites (ER 16.63).

95. The Applicant's No Significant Effects Report concluded that the proposed development was not likely to have a significant effect on any European sites, either alone or in combinations with other projects and plans (ER 16.39). There was no substantive disagreement with this by Interested Parties (ER 16.42). Natural England, the Environment Agency, the Port of London Authority and the Marine Management Organisation agreed with this report (ER 16.51-16.59).
96. As a result of considering the above, the Secretaries of State have concluded that an appropriate assessment is not required as the proposed development was not likely to have a significant effect on any European sites, or on any Ramsar sites, either alone, or in combination with other projects or plans (ER 16.66 and 18.47).

Common law nuisance and statutory nuisance

97. The Secretaries of State have considered aspects of these matters including noise and disturbance and nuisance mitigation in paragraphs 58-76 of this letter.
98. Article 7 (defence to proceedings in respect of statutory nuisance) in the draft Order was amended during the examination and constrained to the project's construction period and the period for other authorised activities related to the project (ER 16.79). The ExA was satisfied that the version of article 7 it recommended had broad agreement, was proportionate, and addressed the main practical concerns. The Secretaries of State agree with the conclusions of the ExA as set out in ER 16.79 and 18.50.

Hazardous substances and safety

99. The Secretaries of State agree with the ExA's comments at ER 16.81-16.82 and 18.51. Having had regard to section 3.7 in the NPS, they concluded that there are no matters before them with regard to such controls and consents, which significantly weigh against making the Order. The Secretaries of State have addressed the other relevant consents sought by the Applicant elsewhere in this letter, including paragraph 39.

Pollution control and other environmental regulatory regimes

100. The Deemed Marine Licence is addressed in paragraphs 34-39 of this letter. The Secretaries of State note that the Applicant has engaged with the relevant parties on these matters and that the engagement has resulted in these matters being addressed in Statements of Common Ground (SoCG) and a legal agreement (ER 16.86). The Secretaries of State also note that by the close of the examination, the Environmental Permitting Regulation permits were under consideration (ER 15.14). In view of the SoCG, the legal agreement, submissions made during the examination, and the ExA's conclusions on these matters, the Secretaries of State are content that there are no overriding outstanding matters in this regard which weigh against approving this Application.

Security considerations

101. The ExA consider that security, resilience to emergencies and safety matters were adequately addressed by the examination (ER 16.119 and 16.123). In view of the Order before them, the Design Principles (Application document APP 206.01), the Code of Construction Practice and the submissions made during the examination, the Secretaries of State are satisfied that security issues have been adequately addressed by the Applicant and there are proposals in place which deliver an appropriate level of security during the construction and operation of the proposed development. They also note that these matters will be further addressed in the Construction Environmental Management Plan and the health, security, safety and environment standards.
102. With regard to Schedule 16 Part 7 in the Order, the Secretaries of State note that, for the most part, the Applicant and the City of London Corporation were able to agree on the wording of the protective provisions for the benefit of the City of London Corporation. They were unable to agree on the inclusion of wording to secure bridges identified within paragraph 2 in the City of London protective provisions (ER 16.120 and 20.277). The Secretaries of State agree with the ExA's conclusion and recommendation at ER 20.278 to include paragraph 4(4) in Schedule 16 Part 7 of the Order as recommended by the ExA.

Waste Management

103. There were several submissions on this matter including the Excavated Material and Waste Commitments document, the Code of Construction Practice, the requirements in the Order and the submissions made by the Applicant and the parties including that of the Mayor of London. In view of these submissions the Secretaries of State agree with the ExA that there are effective proposals for managing waste arising from the decommissioning, and demolition, of existing infrastructure and excavated materials and waste arising during the operational period (ER 16.146-16.150). They also agree with the ExA that the terms of the recommended Order ensures that waste is properly managed on and off site.
104. NPS paragraph 4.14.6 requires the Secretaries of State to consider the effectiveness of the Applicant's proposals for managing waste arising from the decommissioning of the proposed development. The ExA state that waste from decommissioning of the proposed development is not dealt with (ER 16.133). The Applicant does not anticipate decommissioning of the project infrastructure (ES, Volume 1, paragraph 2.2.97-2.2.98 and Volume 2, paragraph 2.4.29). In referring to decommissioning traffic, including the transportation of waste from decommissioning, the ExA concluded that the Applicant's approach towards decommissioning was "reasonable and appropriate given the nature of the project, its anticipated life and the uncertainties as to the timing, nature and scale of any decommissioning work required" (ER 14.3). The Secretaries of the State are content that waste management at the decommissioning stage could be properly addressed when there is greater certainty about decommissioning. As such, the Secretaries of State consider that the absence of proposals for the management of

waste during decommissioning of the proposed development does not significantly weigh against making the Order.

Rationale for the selection of work sites and drive strategies

Carnwath Road Riverside

105. The Secretaries of State accept that the ExA's examination revealed limitations with this site, particularly in terms of noise from river transport (barges) and amenity impacts during construction (ER 17.141), for a period of six years with 29 months of night time working (ER 17.57).
106. In evaluating the use of river transport, the Secretaries of State have balanced the availability of a safeguarded wharf at this site (ER 17.139) and mitigation proposed for noise impacts on residential properties (ER 17.76) with the potential negative impacts over a wider range of local residents and the local road network, were the commitment to river transport not made through requirement PW15 (ER 17.78), and find in favour of using river transport. The Secretaries of State give no weight in making their decision to any proposed future application for acrylic noise barriers on the river wall in front of the properties, since these are outside the limits of land to be acquired or used and not secured by the Order (ER 17.75). The Secretaries of State conclude that mitigation measures offered by the Applicant (ER 17.72-17.75) will alleviate adverse impacts during construction so that the residual impacts on quality of life and health from noise are not significant and the NPS aims on noise have been met (see paragraph 74 of this letter), and therefore too much weight is given by the ExA to these impacts.
107. The Secretaries of State note that mitigation for this site is secured by requirements CARRR2 and PW15 as well as article 60 (ER 17.71). Further, the Secretaries of State agree that the alternative to this site considered by the ExA may result in different adverse impacts (ER 17.112-17.116 and 17.137) and that an alternative drive strategy is not feasible (ER 17.118-17.131, 17.134 and 17.138). The Secretaries of State conclude, in agreement with the ExA, that the Applicant has justified the use of Carnwath Road Riverside (ER 17.140).

Chambers Wharf

108. The ExA concluded that the Applicant had not justified the use of Chambers Wharf as a drive site, which weighed against making the Order (ER 18.65). The Secretaries of State disagree with the ExA and conclude, on balance, that the selection of Chambers Wharf as a drive site is justified. This is for the following reasons.
109. The Secretaries of State consider that the intensity and duration of impacts on residential receptors during the construction period (six years with 33 months of night time working) (ER 17.154), weighs significantly against making the Order (ER 17.186, 17.196 and 18.71). However, the Applicant has offered a wide-ranging package of measures which would substantially mitigate these adverse impacts and which are secured by requirements CHAWF1, PW15 and by unilateral obligations in favour of LB Southwark (ER 17.157, 17.169-17.175, 17.179-17.181 and 18.81). The Secretaries of State note the ExA's reference to the Applicant's statement on further opportunities to

explore additional mitigation measures through the Community Liaison Working Group (ER 17.182). These were not before the ExA and are not secured in the Order, or a matter which in any way informs the Secretaries of State's decision.

110. As set out in paragraph 74 of this letter the Secretaries of State consider that the residual impacts on quality of life and health from noise associated with the proposed development are less than significant. This reflects the fact that the Applicant has offered a wide-ranging package of mitigation measures which would also substantially mitigate the adverse impacts on the community at Chambers Wharf.
111. On the basis of their approach to the first NPS aim on noise the ExA concluded that the selection of Chambers Wharf as a drive site was not justified and that they needed to look at alternative drive sites (ER 17.209-17.274) to see whether significant adverse impacts from noise and vibration could be avoided. However, for the reasons set out in paragraphs 69-73 of this letter, the Secretaries of State conclude that significant adverse noise impacts at Chambers Wharf have been avoided. The Secretaries of State therefore conclude that there is no need for them to consider whether an amended scheme could achieve similar benefits but with less harm, and therefore any further consideration of a reversed drive strategy and alternative drive sites is unnecessary. Further weighing in the balance is the significant weight given by the Secretaries of State to the opportunity to wholly use river transport at Chambers Wharf (ER 17.288), complying with the test at NPS paragraph 4.13.10. Further, for the reasons set out in this letter as a whole, the Secretaries of State consider that this Application accords with the NPS and that the harm is not such that it outweighs the benefits of the application.
112. Overall, the Secretaries of State consider that the tests in the NPS in relation to site selection have been met and that, whilst the impacts at Chambers Wharf will be adverse and of long duration, on balance, the Order should be made with Chambers Wharf as a drive site.

Deptford Church Street

113. The Secretaries of State accept that the ExA's examination revealed limitations with this site, particularly in terms of loss of open space in an area of deprivation and in respect of noise impacts on St Joseph's Roman Catholic Primary School and on St Paul's Church, for a period of three and half years during construction (ER 17.309 and 17.358).
114. The Secretaries of State acknowledge that the ExA consider the loss of open space at this site to be a matter weighing against making the Order (ER 18.25, 18.71, 18.77 and 18.80). They agree with the ExA, that Crossfield Amenity Green is not surplus to requirements and that even the temporary period in which it will be used as a work site will represent a serious loss to the community (ER 17.356). However, the Secretaries of State agree with the ExA that the impact will be mitigated (ER 17.315-17.317, 17.319, 17.322 and 17.335) and the adverse impact on the landscape will be reversed (ER 17.356). They also note that it will be open to the local authority to secure with the Applicant through the consent process under section 61 of the Control of Pollution Act

1974, additional mitigation measures in the form of noise enclosures (ER 17.321), to help minimise noise impacts predicted on receptors (ER 17.320).

115. The Secretaries of State agree that the alternative sites considered (ER 17.338-17.353) offer no less significant impacts, (ER 17.350, 17.353 and 17.357), that the need for, and benefits of, the project overall outweigh the adverse effects and the temporary loss of open space, and are satisfied that impacts are mitigated as far as practicable since some disruption is unavoidable in a project of this scale (ER 18.81).

King Edward Memorial Park Foreshore

116. The Secretaries of State accept that the examination revealed limitations with this site, particularly in terms of loss of open space and noise and amenity impacts in a borough with limited open space (ER 17.440) with an adjacent school (ER 17.439), for a period of three and half years of construction (ER 17.370).

117. The Secretaries of State agree with the ExA that the loss of the open space during construction will be a serious loss to the local community and that this space cannot be said to be surplus to requirements (ER 17.442). They also agree that this is an important factor weighing against making the Order (ER 18.25). However, the Secretaries of State agree with the ExA that mitigation will be secured (ER 17.372, 17.382-17.387, 17.389, 17.406 and 17.442), and note the agreements committed to by the Applicant, to improve play facilities in the locality during construction and landscaping in King Edward Memorial Park which are secured by a section 106 agreement (ER 17.391). Further, they agree with the ExA and regard as a benefit the permanent provision of additional open space created on the foreshore structure in a borough which has so little (ER 17.405 and 18.70).

118. In considering amenity impacts, the Secretaries of State have considered the ExA's proposal to include in the Order a requirement to restrict Saturday working, through requirement KEMPF18 (ER 17.392 and 17.444). As explained at paragraphs 55 and 62 of this letter, the Secretaries of State agree with the proposal. They also note that it will be open to the local authority to make, if it wishes, additional agreements with the contractors through the consent process for section 61 of the Control of Pollution Act 1974 (ER 17.393).

119. Balancing the fact that alternative sites and connection options considered by the ExA in relation to this site (ER 17.410-17.436) offer no less significant impacts (ER 17.443), the commitment to river transport (secured by requirement PW15) (ER 17.374) and the need and benefits of the project as a whole, the Secretaries of State agree with the ExA and consider that the case for this site has been made out by the Applicant.

Barn Elms

120. The Secretaries of State agree with the conclusion of the ExA that the selection of a work site at Barn Elms and a CSO interception site at Putney is justified (ER 17.453).

Putney Embankment Foreshore

121. The Secretaries of State agree with the conclusion of the ExA that the worksite at this location should be west of Putney Bridge, as per the application (ER 17.464).

Conclusions on selection of work sites and drive strategies

122. The Secretaries of State agree with the ExA's conclusion in ER 18.69 that the NPS has been complied with, thereby weighing significantly in favour of making the Order; that the overall tunnel route proposed by the Applicant has been justified (ER 17.28 and 17.466) and that the Applicant has justified its specific design and site selection decisions (ER 17.466, 17.468 and 18.60). The Secretaries of State disagree with the ExA (ER 17.469) and conclude that the selection of Chambers Wharf as a drive site is justified, although they agree that the adverse nature and duration of impacts at that site weigh against granting development consent.

Compulsory acquisition and related matters

123. The Secretaries of State have considered the compulsory acquisition powers sought by the Applicant against the conditions concerning compulsory acquisition in sections 122 and 123 of the 2008 Act, and have taken into account the cases of the objectors set out at ER 19.92-19.419. They agree with the ExA that the legal interests in all plots described and set out in the book of reference and on the land plans would be required in order to implement the proposed development (ER 19.3-19.16, 19.264 and 19.443): that the national need for this infrastructure has been demonstrated in the NPS (NPS paragraph 2.6.34 and paragraph A1.3 and ER 3.14); that it represents a significant public benefit for which there is a compelling case in the public interest (ER 19.445); that the need to secure the land rights required to construct the development within a reasonable timescale represents a significant public benefit (ER 19.444); that the Applicant has shown that all reasonable alternatives to compulsory acquisition have been explored (ER 19.43-19.50) and that the private loss to those affected has been appropriately mitigated (ER 19.444).

124. With regard to section 104(3) of the 2008 Act, the Secretaries of State conclude that the Application is overall in accordance with the NPS, and they agree with the ExA that, on balance, development consent should be granted (ER 18.82), for the reasons set out in the Case for Development and Secretaries of State's Conclusions and Decision sections of this letter. The Secretaries of State consider that these matters are relevant in weighing up the public benefits of the Application against the adverse impacts, including the private loss to those affected by the compulsory acquisition of land.

125. The Secretaries of State agree that there is an established regulatory regime for funding the project (including compulsory acquisition costs and non-compulsory acquisition compensation and project costs) and therefore it is reasonable to conclude that funding would be made available. They agree with the ExA that the resource implications of possible acquisition resulting from a blight notice, and other non-statutory measures such as discretionary re-housing and off-site mitigations have also been taken into account in relation to funding (ER 19.431-19.439 and 19.444).

126. They also agree with the ExA that the requirements of Article 1 of the First Protocol, Article 6, and Article 8 of the European Convention on Human Rights, as codified into UK law by the Human Rights Act 1998, have been met for the reasons given at ER 19.423-19.430 and 19.444. They accordingly agree with the ExA that there is a compelling case in the public interest for granting the Applicant compulsory acquisition powers in respect of the compulsory acquisition land as shown on the Land Plans (ER 19.445). The Secretaries of State therefore agree with the ExA that the conditions for compulsory acquisition are met (ER 19.20 and 19.443-19.445) and that this would be in accordance with the NPS.

Open space land

127. The ExA referred at ER 19.51-19.57 to open space land required for the proposed development. In the letter referred to at paragraph 9 above, the Secretary of State for Communities and Local Government has granted a certificate dated 1 September 2014 further to the provisions of sections 131 and 132 of the 2008 Act (as amended by the Growth and Infrastructure Act 2013) allowing the acquisition of open space land without replacement. Accordingly, the Order is not subject to Special Parliamentary Procedure.

Telecommunications operators

128. With regard to the four licensed telecommunications operators referred to at ER appendix E6, paragraph 11, and Vodafone, also a licensed telecommunication operator, the Secretaries of State are satisfied under section 138(4)(a) of the 2008 Act, that extinguishment of the rights of, and/or removal of the apparatus of, such operators, is necessary for the purposes of carrying out the proposed development and hence that articles 28-34, which authorise such extinguishment and/or removal, may be included in the Order. The Secretary of State for Culture, Media and Sport has given his consent in a letter dated 2 September 2014 under section 138(4)(b) of the 2008 Act to the inclusion of those provisions in relation to British Telecommunications plc's rights/apparatus.

Transport operators

129. With regard to the five licensed transport operators referred to at ER appendix E3, paragraph 35, the Secretaries of State are satisfied under section 138(4)(a) of the 2008 Act, that extinguishment of the rights of, and/or removal of the apparatus of, such operators, is necessary for the purposes of carrying out the proposed development and hence that articles 28-34, which authorise such extinguishment and/or removal may be included in the Order. The Secretary of State for Transport has given his consent in a letter dated 6 August 2014 under section 138(4)(b) of the 2008 Act to the inclusion of those provisions in relation to Network Rail's rights/apparatus.

130. Further, with regard to Network Rail, referred to at ER appendix E3, paragraphs 32-34, the Secretary of State for Transport is satisfied that land, used for the purposes of carrying on the undertakers' undertakings and which is authorised to be acquired by the Applicant under articles 28-34 of the Order, can be purchased and not replaced without serious detriment to the carrying on of the undertakings. The Secretary of State for Transport has issued a certificate dated 6 August 2014 to that effect under section 127(2)(b) of the 2008 Act.

Energy operators

131. With regard to the three licensed energy operators referred to at ER appendix E5 paragraph 12, the Secretaries of State are satisfied that extinguishment of the rights of, and/or removal of the apparatus of, such operators, is necessary for the purposes of carrying out the proposed development and hence that articles 28-34, which authorise such extinguishment and/or removal may be included in the Order. The Secretary of State for Energy & Climate Change has given his consent in a letter dated 16 July 2014 under section 138(4)(b) of the 2008 Act to the inclusion of those provisions.

Environment Agency

132. With regard to the Environment Agency, referred to at ER appendix E4 paragraph 11, the Secretary of State for Environment, Food and Rural Affairs is satisfied that land used for the purposes of carrying on the undertakers' undertaking and which is authorised to be acquired by the Applicant under articles 28-34 of the Order, can be purchased and not replaced without serious detriment to the carrying on of the undertaking. The Secretary of State for Environment, Food and Rural Affairs has issued a certificate dated 17 July to that effect under section 127(2)(b) of the 2008 Act.

Overall conclusion on compulsory acquisition and related matters

133. The Secretaries of State agree with the ExA that the condition in section 122(2) of the 2008 Act is met (ER 19.443). The Secretaries of State agree with the ExA (ER 19.20) and are satisfied that the condition in section 123(2) of the 2008 Act is met.
134. They are satisfied that, for the reasons summarised in ER 21.4, there is a compelling case in the public interest for the compulsory acquisition powers sought in respect of the compulsory acquisition land shown on the land plans (as amended) (ER 19.444-19.445 and 21.5). Accordingly, the Secretaries of State agree that the condition in section 122(3) of the 2008 Act is met.

Safeguarding

135. The Secretaries of State agree with the ExA that, on balance, it is appropriate to include the safeguarding provisions as drafted by the Applicant in article 52 the Order (ER 20.173), although they do not agree with the ExA's reasons for recommending inclusion of this article.
136. The Secretaries of State consider that the provisions in article 52 are physically more specific than those included in the Directions served on the affected local planning authorities on 15 March 2013 in relation to the Thames Tideway Tunnel Project. Unlike those Directions, the provisions in article 52 would ensure safeguarding after completion of construction, for the lifetime of the project. Given the proposed lifetime of this project the Secretaries of State consider that including safeguarding provisions in the Order would be appropriate in this case and provide the Applicant with certainty in relation to such provisions.

137. The Secretaries of State have identified the need to remove duplication and possible confusion in relation to safeguarding provisions during the construction of the project. Accordingly, the Directions served on 15 March 2013 will be revoked when the Order comes into force.

The case for and against development

138. For the reasons given in this letter the Secretaries of State consider that the following matters although important and relevant **do not have significant weight in the decision whether or not to make an Order granting development consent for the proposed development:** air quality, coastal and river change, visual impact in relation to permanent works, flood risk and climate change, use of previously developed land, loss of open space (other than at Deptford Church Street and King Edward Memorial Park Foreshore), regeneration, traffic, travel and transport, hazardous substances, pollution control, security and waste management.

139. The Secretaries of State have come to this view based on the scale and nature of the impacts, the steps the Applicant has taken to minimise adverse impacts, for example through design, mitigation, compensation and agreements, and the accordance with the NPS and other relevant policies and legislation, as outlined above in paragraphs 32-137.

140. The Secretaries of State consider that **the following matters significantly weigh against granting consent to the proposed development:** visual impacts during construction, adverse impacts on / harm to heritage assets, inappropriate development within Metropolitan Open Land, loss of public open space at Deptford Church Street and King Edward Memorial Park Foreshore during construction, noise and disturbance and associated adverse effects on amenity, health and well-being, particularly at Chambers Wharf, during construction and adverse socio-economic effects resulting from displacement of businesses and amenity impacts on businesses during construction.

141. With regard to visual impacts during construction, these will be minimised through mitigation measures but because of the scale and nature of the works these will only partially mitigate the adverse effects. However, on balance, the Secretaries of State consider that the benefits of the proposed development are sufficient to outweigh the temporary adverse effects.

142. With regards to the harm to heritage assets, the NPS contains a presumption in favour of the conservation of designated heritage assets and the greater the negative impact on the significance of the affected designated heritage asset, the greater the benefits that will be needed to justify approval. The Secretaries of State have had regard to this, and the duties set out in regulation 3 of the Infrastructure Planning (Decisions) Regulations 2010. The Secretaries of State therefore have given considerable importance and weight to the desirability of preserving affected heritage assets or their setting. They have concluded that there is a clear and convincing justification for any loss in that the overall harm by the permanent above ground works can be characterised as less than significant in NPS terms and the impacts on the settings of the heritage assets during the construction phase are temporary. Furthermore the Secretaries of State agree that the

benefits of the proposed development are sufficient to outweigh the harm to the heritage assets, whether considered individually or collectively.

143. With regard to development within Metropolitan Open Land the Secretaries of State conclude that inappropriate development within Metropolitan Open Land at Barn Elms and King George's Park although relatively minor in both locations, attracts substantial weight against making the Order. In assessing the harm to Metropolitan Open Land the Secretaries of state have given consideration to the implications of the recent High Court judgment of *Redhill Aerodrome Ltd v. Secretary of State for Communities and Local Government and others* but do not consider that it raises any new important and relevant matters sufficient to affect the decision in this case. The Secretaries of State agree that the benefits of the proposed development are sufficient to clearly outweigh the harm by reason of inappropriateness and any other harm whether to Metropolitan Open Land or otherwise and so very special circumstances exist to justify development in Metropolitan Open Land.

144. With regard to the selection of Chambers Wharf as a drive site, the Secretaries of State conclude that, on balance, the selection of Chambers Wharf as a drive site is justified but recognise that the intensity and duration of impacts during the construction period weigh against granting development consent.

145. Therefore with regard to the important and relevant matters weighing significantly in favour of not granting consent to the proposed development, the Secretaries of State place particular emphasis on:

- The adverse noise impacts during construction and the associated impacts on amenity, health and well-being of local communities. This is based on the duration and intensity of adverse impacts experienced at many work sites, but particularly at Chambers Wharf
- Loss of open space at Deptford Church Street and King Edward Memorial Park Foreshore during construction
- Harm to affected heritage assets or their setting resulting from the development which include assets of the highest significance.

146. The Secretaries of State consider that the following matters in favour of granting consent to the proposed development are important and relevant and should be accorded significant weight:

- Benefits to ecology of the River Thames and Tidal Tributaries Site of Interest for Nature Conservation during the operational phase of the project
- Provision of new public realm and public open space during the operational phase of the project
- Socio-economic benefits resulting from generation of employment during the construction phase
- Improved river recreational opportunities resulting from improved water quality during the operational phase of the project

- Improved river water quality and the resultant contribution towards meeting the Urban Waste Water Treatment Directive and the Water Framework Directive during the operational phase of the project.

147. In weighing the matters for and against making the Order, the Secretaries of State have had regard to the recognition in the NPS (paragraph 1.4.4) that the sustainability effects of new waste water NSIPs need to be considered within the context of their 'mature urban environment' and that because of their setting, adverse visual effects and noise disturbance are likely to occur during the construction phase. The Secretaries of State have therefore taken this into account and considered the route and sites of the proposed development, with its 24 proposed work sites in London, in close proximity to existing development, often including high density housing.

148. Additionally the Secretaries of State have taken the following factors into account in weighing the matters for and against making the Order:

- Most of the adverse impacts occur during the expected (up to) six year construction phase only, with far lesser adverse impacts likely during the operational phase of the project, and the harm overall would be significantly outweighed by the benefits from the proposed development which has an expected design life of 120 years
- The NPS and the obligation in section 104(3) of the 2008 Act to decide an application in accordance with it (subject to any exceptions that apply in sub-sections 104(4) to (8))
- The changes made to the Order by the Secretaries of State as set out in paragraph 152-160 of this letter.

The Secretaries of State's Conclusions and Decision

149. For the reasons given in this letter, the Secretaries of State therefore conclude that on balance there is a good case for making an Order granting development consent for the proposed development and that this case is not outweighed by the likely adverse impacts of the development as mitigated by the proposed terms of the Order and related legal agreements.

150. The Secretaries of State have therefore decided to accept the ExA's recommendation at ER 21.7 to make the Order granting development consent on the basis of the provisions set out in the draft Order proposed by the ExA, subject to the modifications outlined in paragraph 152-160 of this letter.

151. They confirm that, in reaching this decision, they have had regard to the local impact reports referred to in paragraph 10 above, and to all other matters which they consider are both important and relevant to their decision, including the NPS and those policy and strategy documents identified as relevant, as required by section 104 of the 2008 Act. The Secretaries of State confirm for the purposes of regulation 3(2) of the 2009 Regulations that they have taken into consideration the environmental information as defined in regulation 2(1) of those Regulations.

Amendments to the Order

152. The Secretaries of State have decided to make the following modifications to the form of the Order recommended by the ExA as outlined below.
153. Paragraph 1(g) of article 61 has been removed because the Secretaries of State consider that this wording is insufficiently precise.
154. Article 62 has been amended to make it clear that the definition of the Secretary of State is for the purposes of the provisions of this Order.
155. Schedule 1 has been amended to clarify the status of certain works comprising associated development the status of which was unclear from the draft Order recommended by the ExA.
156. Requirement PW17 in Schedule 3 has been modified, to include additional wording in paragraph 2.1 so as to clarify the definition of habitable rooms (see paragraph 66 of this letter), to make clear that where noise insulation cannot reasonably be installed in any residential properties (including houseboats and not just 'special cases – residential') the trigger values for temporary rehousing are the same as for noise insulation, and to clarify the distinction between special cases – residential and houseboats. Requirement PW17 has also been amended to make clear that the time periods for trigger values set out in the Applicant's revised off-site mitigation and compensation policy document apply to both noise insulation and temporary rehousing.
157. The ExA added requirement KEMPF18 in Schedule 3 such that the standard working hours set out in the Applicant's Code of Construction Practice Part B do not include 08.00 to 13.00 hours on Saturdays in relation to the King Edward Memorial Park Foreshore worksite, for the reasons set out in paragraph 55 of this letter. The Secretaries of State have amended the definition of "CoCP Part B" in requirement PW1 to reflect this.
158. The definition of the "scour and mitigation strategy" in the Deemed Marine Licence (in Schedule 15), to be submitted under Condition 8, has been modified to make clear that this has to be in accordance with the principles set out in the Four Way Legal Agreement (ER 7.6-7.12) as subsequently varied by the parties, as set out in the post-examination representation from the Applicant dated 14 August 2014.
159. Paragraph 8 of part 6 of Schedule 16 has been deleted so as to be with consistent with the removal of paragraph 7 of article 43 as recommended by the ExA.
160. The Secretaries of State have also decided to make various minor drafting changes which do not materially alter the effect of the Order, including changes to conform with current practice for Statutory Instruments (e.g. modernisation of language and gender neutrality), changes in the interests of clarity and consistency (e.g. in relation to footnotes), and changes to ensure that the Order has the intended effect.

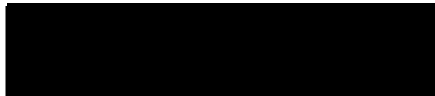
Challenge to Decision

161. Information regarding the right to challenge the legality of the Secretaries of State's decision is set out in the note attached as Annex C to this letter.

Publicity for Decision

162. The Secretaries of State's decision on the Application and their reasons for deciding it are being published as required by section 116 of the 2008 Act and regulation 23 of the 2009 Regulations.

Yours faithfully,



Lindsay Speed

Authorised by the Secretary of State to sign
on their behalf

**Department for Communities and Local
Government**



Sarah Fairbrother

Authorised by the Secretary of State to sign
on their behalf

**Department for Environment, Food and
Rural Affairs**

ANNEX A

TYPES AND LOCATIONS OF HEARINGS HELD BETWEEN 11 NOVEMBER 2013 AND 6 FEBRUARY 2014 WITH REGARDS TO THE PROPOSED THAMES TIDEWAY TUNNEL DURING THE EXAMINATION STAGE

<u>Hearing Type</u>	<u>Date</u>	<u>Location</u>
Issue Specific Hearing	11 Nov 2013	America Square Conference Centre, Tower Hill
Issue Specific Hearing	12 Nov 2013	America Square Conference Centre, Tower Hill
Issue Specific Hearing	13 Nov 2013	America Square Conference Centre, Tower Hill
Issue Specific Hearing	14 Nov 2013	America Square Conference Centre, Tower Hill
Issue Specific Hearing	15 Nov 2013	America Square Conference Centre, Tower Hill
Open Floor Hearing	19 Nov 2013	Grange Tower Bridge Hotel, Tower Hill
Open Floor Hearing	20 Nov 2013	The Worx, Parsons Green
Open Floor Hearing	21 Nov 2013	The Ahoy Centre, Deptford
Open Floor Hearing	22 Nov 2013	Glaziers Hall, London Bridge
Open Floor Hearing	23 Nov 2013	The Queen Elizabeth II Centre
Issue Specific Hearing	26 Nov 2013	America Square Conference Centre, Tower Hill
Issue Specific Hearing	27 Nov 2013	America Square Conference Centre, Tower Hill
Compulsory Acquisition Hearing	28 Nov 2013	America Square Conference Centre, Tower Hill
Compulsory Acquisition Hearing	29 Nov 2013	America Square Conference Centre, Tower Hill
Compulsory Acquisition Hearing	03 Dec 2013	America Square Conference Centre, Tower Hill
Compulsory Acquisition Hearing	04 Dec 2013	America Square Conference Centre, Tower Hill

Compulsory Acquisition Hearing	05 Dec 2013	America Square Conference Centre, Tower Hill
Compulsory Acquisition Hearing	06 Dec 2013	America Square Conference Centre, Tower Hill
Compulsory Acquisition Hearing	10 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	11 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	12 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	13 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	17 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	18 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	19 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	20 Dec 2013	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	14 Jan 2014	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	15 Jan 2014	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	16 Jan 2014	Glaziers Hall, London Bridge
Compulsory Acquisition Hearing	17 Jan 2014	Glaziers Hall, London Bridge
Issue Specific Hearing	20 Jan 2014	Glaziers Hall, London Bridge
Issue Specific Hearing	21 Jan 2014	Glaziers Hall, London Bridge
Issue Specific Hearing	22 Jan 2014	Glaziers Hall, London Bridge
Issue Specific Hearing	23 Jan 2014	Glaziers Hall, London Bridge
Issue Specific Hearing	24 Jan 2014	Glaziers Hall, London Bridge
Compulsory Acquisition	27 Jan 2014	Glaziers Hall, London Bridge

Hearing

Compulsory Acquisition Hearing	28 Jan 2014	Glaziers Hall, London Bridge
Open Floor Hearing	29 Jan 2014	St Paul's Shadwell
Open Floor Hearing	30 Jan 2014	Hurlingham and Chelsea School, Putney
Open Floor Hearing	03 Feb 2014	Glaziers Hall, London Bridge
Issue Specific Hearing	04 Feb 2014	Glaziers Hall, London Bridge
Open Floor Hearing	05 Feb 2014	Ahoy Centre and Deptford Lounge, Deptford
Issue Specific Hearing	06 Feb 2014	Glaziers Hall, London Bridge
Resumption of adjourned Issue Specific Hearing on noise and vibration.	20 Feb 2014	Glaziers Hall, London Bridge
Resumption of adjourned Issue Specific Hearing on DCO and related matters.	21 Feb 2014	Institution of Civil Engineers, Westminster

ANNEX B

LOCAL IMPACT REPORTS SUBMITTED BY LOCAL AUTHORITIES & THE MAYOR OF LONDON DURING THE EXAMINATION STAGE OF THE THAMES TIDEWAY TUNNEL PROPOSAL

<u>Local Authority</u>	<u>Date Published</u>	<u>Report</u>
London Borough of Hounslow	18 Oct 2013	Local Impact
London Borough of Ealing	23 Oct 2013	Local Impact
London Borough of Newham	23 Oct 2013	Local Impact
Mayor of London	01 Nov 2013	Local Impact
London Borough of Lambeth	04 Nov 2013	Local Impact
London Borough of Hammersmith and Fulham	06 Nov 2013	Local Impact
London Borough of Tower Hamlets	06 Nov 2013	Local Impact
London Borough of Lewisham	06 Nov 2013	Local Impact
London Borough of Richmond Upon Thames	06 Nov 2013	Local Impact
Westminster City Council	06 Nov 2013	Local Impact
City of London Corporation	06 Nov 2013	Local Impact
Wandsworth Borough Council	07 Nov 2013	Local Impact
London Borough of Southwark	07 Nov 2013	Local Impact
Royal Borough of Kensington and Chelsea	07 Nov 2013	Local Impact

ANNEX C

LEGAL CHALLENGES RELATING TO APPLICATIONS FOR DEVELOPMENT CONSENT ORDERS

Under section 118 of the Planning Act 2008, an Order granting development consent, or anything done, or omitted to be done, by the former Infrastructure Planning Commission, the Planning Inspectorate or the Secretaries of State in relation to an application for such an Order, can be challenged only by means of a claim for judicial review. A claim for judicial review must be made to the high court during the period of six weeks from the date when the Order is published or if later, the date on which the statement of reasons for making the order is published. In this case, the Thames Tideway Tunnel Order as made is being published on the same date as this letter on the Planning Inspectorate website at the following address:

<http://infrastructure.planningportal.gov.uk/projects/london/thames-tideway-tunnel/>

These notes are provided for guidance only. A person who thinks they may have grounds for challenging the decision to make the Order referred to in this letter or anything done, or omitted to be done, by the former Infrastructure Planning Commission, the Planning Inspectorate or the Secretaries of State in relation to the application for this Order, is advised to seek legal advice before taking any action. If you require advice on the process for making any challenge you should contact the Administrative Court Office at the Royal Courts of Justice, Strand, London WC2A 2LL (0207 947 6655).



The Planning Act 2008 (as amended)

Thames Tideway Tunnel

**Examining authority's Report of Findings and Conclusions
and
Recommendation to the
Secretary of State for Communities and Local Government
and the
Secretary of State for Environment, Food and Rural Affairs**

Jan Bessell

Libby Gawith

Emrys Parry

Andrew Phillipson

David Prentis

Examining Authority

Date: 12 June 2014

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The Examining authority's findings and conclusions and recommendation in respect of the proposed Thames Tideway Tunnel

File Ref: WW010001

The application, dated 28 February 2013, was made under section 37 of the Planning Act 2008 (as amended) (PA 2008) and was received in full by the Planning Inspectorate on 28 February 2013.

The Applicant is Thames Water Utilities Limited.

The application was accepted for examination on 27 March 2013.

The Preliminary Meeting was held on 12 September 2013. The examination of the application therefore began on 13 September 2013 and was completed on 12 March 2014.

The development proposed is for the construction and operation of a waste water storage and transfer project in London and in summary comprises:

- Main tunnel
- Connection tunnels
- Main tunnel work sites
- Combined sewer overflow (CSO) work sites
- System modification sites
- Beckton Sewage Treatment Works Associated Development
- Other Associated Development and
- Ancillary works.

Summary of Recommendation:

The Panel, as Examining authority (ExA) under the Planning Act 2008 (as amended), recommends that the Secretary of State for Communities and Local Government and Secretary of State for Environment, Food and Rural Affairs (Secretaries of State) should make an order granting development consent, subject to modifications in the form at appendix F.

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ERRATA SHEET – Thames Tideway Tunnel - Ref. WW010001

Examining authority's Report of Findings and Conclusions and Recommendation to the Secretary of State for Communities and Local Government and the Secretary of State for Environment, Food and Rural Affairs

Corrections agreed by the Examining authority prior to a decision being made

Main Report

Page No.	Paragraph	Correction
109	10.21	Missing heading before this paragraph. Heading to read: 'Conclusions on archaeology'
118	10.62	Missing heading before this paragraph. Heading to read: 'Conclusions on effects on the setting of heritage assets during construction'
154	11.79	Reference to 'NPS, para 4.8.4' should be 'NPS, para 4.8.5'
167	12.15	In first bullet, second line, add ',mitigate' after 'avoid'
195	12.148	Replace 'Pipers' with 'the Piper'
203	12.192	Replace the word 'noise' with 'vibration' in 'ground-borne noise – non-residential receptors'
314	17.84	Replace 'Pipers' with 'the Piper'
338	17.213	Final sentence, replace 'purse' with 'pursue'
366	17.370	In fifth line, replace 'reminder' with 'remainder'
483	20.28	Replace '2014' with '2013'

Appendix E6

Page No.	Paragraph/line	Correction
5	20, Line 1	Replace 'Panel' with 'Secretary of State'
5	20	Replace '11 March' with '12 March'

12 NOISE AND DISTURBANCE

INTRODUCTION

- 12.1 The National Policy Statement for Waste Water: A framework document for planning decisions on nationally significant waste water infrastructure, March 2012 (NPS) specifically requires the decision maker to consider the impacts of noise and vibration and the potential for adverse impacts on amenity, health and quality of life from the proposed development.
- 12.2 The impacts of noise and disturbance would mainly occur during the construction phase of the project, which has an overall construction phase expected to be six years. A number of the surface construction work sites would be located within residential areas and close to other noise sensitive receptors such as schools. As stated in chapter 1, there were over 1,200 relevant representations many of which raised issues on the potential impacts on homes and businesses from noise and disturbance during construction. Particular repeated mention was made of Carnwath Road Riverside, Kirtling Street, Chambers Wharf and King Edward Memorial Park Foreshore.
- 12.3 This concern was echoed in the Local Impact Reports (LIRs), including:
- London Borough of (LB) Hammersmith and Fulham, with regard to Carnwath Road Riverside
 - LB Wandsworth, with regard to Kirtling Street and Heathwall Pumping Station
 - LB Southwark, with regard to Chambers Wharf
 - LB Tower Hamlets, with regard to King Edward Memorial Park Foreshore.
- 12.4 The volume of errata and new material submitted by the Applicant and referred to in the Introduction to this report (chapter 1, under the heading 'the examination and procedural decisions'), came into particular focus when dealing with the issue of noise.

Issues raised during the examination

- 12.5 Noise is a subject that was frequently raised at the Issue Specific (IS) hearings on the rationale for the selection of the sites and the draft Development Consent Order (DCO) and related matters. The issues raised cover the whole spectrum of the noise assessment, including:
- baseline noise surveys
 - methodology used for the assessment of significant effects
 - assessment of significant effects from construction sites, road and river transport
 - on-site mitigation measures
 - control of noise from work sites

- off-site mitigation measures including noise insulation, temporary rehousing and trigger levels for eligibility
- health impacts on the communities living around the sites
- selection of the sites (which we consider in chapter 17).

12.6 We received many written submissions on these matters, both from the local authorities and other Interested Parties. These included:

- Carnwath Road Coalition (WRR010)
- Arhag Housing Association (WRR035) regarding Carnwath Road Riverside
- Assael Architecture (REP375) regarding impacts on non-residential properties at Carnwath Road Riverside
- Mark and May Hale (WRR077) regarding houseboats at Nine Elms Pier, Kirtling Street
- St James Group Ltd (RRP700) regarding Kirtling Street and the Riverlight development
- David Starkie (WRR037) regarding Elms Quay Court near to Heathwall Pumping Station
- Save Your Riverside (WRR085) regarding Chambers Wharf
- Downings Roads Moorings regarding Chambers Wharf (WRR081)
- Free Trade Wharf Management Company Ltd (WRR040) regarding King Edward Memorial Park Foreshore
- Save KEMP (WRR084) regarding King Edward Memorial Park Foreshore.

Noise data submitted

12.7 The data on noise in the Environmental Statement (ES) as submitted with the application is spread across numerous volumes (Doc 6.2.02 to 6.2.27). The methodology applied for the environmental assessment of noise and vibration is given in section 9 of Volume 2 of the ES (Doc 6.2.02) and the environmental noise assessments themselves are set out site by site in chapter 9 and appendix G of each site-specific volume (Doc 6.2.04 to 6.2.27). Noise contours for the project-wide effects from tunnelling are given in the ES (Doc 6.2.03, Volume 3, figures 9.5.1 to 9.5.11). Several sets of errata at different stages of the examination were also issued (eg Doc 9.04.01 series, Doc 9.04.04, APP123, and APP200).

12.8 In addition to the significant number of errata, additional mitigation measures were introduced and further surveys were undertaken during the course of the examination. During the examination it became clear from the volume of errata and new material that there was a risk, both during the examination and subsequently, of a 'paper chase'. A number of Interested Parties made this point during hearings (for example Free Trade Management Company Ltd, Save Your Riverside and Mr Hale of Nine Elms Pier). In response we asked that the Applicant address

these issues and clarify the environmental information to be relied upon. The Applicant issued a draft ES Update Report on 14 February 2014 which was then updated and finalised on 11 March 2014 (APP208.01 with appendices APP208.01.01 to 208.01.33). The ES Update Report is intended to bring the data and referencing together.

12.9 For ease of reference we have set out below the main sets of data (relating to noise) submitted by the Applicant and considered during the examination, in addition to that contained in the ES and errata. These include:

- noise contours for the work sites showing a snapshot of the construction noise for a typical construction year, $dB_{L_{Aeq,T}}$ (Doc 9.11.01 to Doc 9.11.24)
- plans showing a summary of significant effects on residential and non-residential receptors by site (Doc 9.11.01 to Doc 9.11.24)
- answers to the ExA's Q11.1 to Q11.40 (APP11, with appendices APP11.01.01, 11.09.01 and 11.41.01)
- IS hearing on the rationale for site selection and drive strategies (11 November 2013 to 15 November 2013), audio tapes and written summaries (APP31.01 to APP31.04)
- answers to the ExA's Q29.1 to Q29.19 (APP56 with appendices APP56.04.01 to APP56.04.13)
- IS hearing on the rationale for site selection and drive strategies (22 January 2014 to 23 January 2014), audio tapes and written summaries (APP102.03 and APP102.04). APP102.03, appendix B includes noise hierarchy table
- answer to ExA's Q29.2 - Supplementary information (APP97, dated 24 January 2014)
- APP111, APP112 and APP113 issued 3 February 2014
- IS hearing on noise 4 and 5 February 2014, audio tapes and written summary (APP115.01) and resumed IS hearing on noise 20 February 2014, audio tape and written summary (APP157)
- Noise Limits Discussion paper (APP150, issued 19 February 2014)
- Off-site Mitigation Discussion paper (APP152, issued 19 February 2014)
- answers to the ExA's R57.1 to R57.16 (APP167)
- a summary of additional mitigation measures and revisions to compensation policies (APP185)
- Off-site Mitigation Paper update (APP187, dated 3 March 2014)
- Noise Limits Paper update (APP188, dated 3 March 2014)
- Non-statutory off-site mitigation and compensation policy (final version APP210.01, dated 11 March 2014)
- the Legal Agreement for Securing of Off-site Mitigation Policies and Resources for Local Planning Authorities (APP209.03), which include the properties, premises and buildings in respect of which Trigger Action Plans (TAPs)

would be prepared (appendix 1) and the Non-statutory off-site mitigation and compensation policy (appendix 3).

12.10 There were a great number of written submissions from other Parties regarding noise and disturbance, which included data. These include:

- St James Group Ltd (WRR087, includes suggested noise limits and two reports on noise and vibration impacts on the Riverlight development by Robert Bird Group and WSP)
- St James Group Ltd (REP457, includes suggested noise limits)
- LB Southwark (WRR075 includes Bureau Veritas noise assessment)
- LB Southwark (REP491, includes suggested noise limits)
- Save Your Riverside (WRR085 includes Rupert Taylor's report on noise and vibration at Chambers Wharf, November 2013)
- Downings Roads Moorings (REP194, includes Rupert Taylor's report on noise impacts on houseboats 2 December 2013)
- Save Your Riverside (REP496 includes feedback on TAPs)
- LB Tower Hamlets (REP096, includes Report on Baseline Survey at King Edward Memorial Park (KEMP) and Free Trade Wharf by 7th Wave Acoustics, November 2013)
- Carnwath Road Coalition (REP186 to REP189, which include reports on noise pollution and non-auditory effects on health).

STRUCTURE OF THE NOISE AND DISTURBANCE CHAPTER

12.11 This chapter of the report addresses the noise and disturbance impacts of the construction phase of the proposed development assessed against the relevant government policy and other guidance documents. Noise matters relating to the operational phase of the project were examined and we are satisfied that, with the current drafting on the DCO, they have been adequately dealt with. Noise matters which relate to the consideration of alternative sites, or to alternative tunnel drive strategies, are considered in chapter 17.

12.12 We begin by setting out the policy context for the decision maker and then the Applicant's approach to both the examination and its interpretation of noise policy.

12.13 We then consider the issues that have arisen from the Applicant's:

- Baseline surveys
- Predictions of noise and vibration levels
- Methodologies used for the assessment of significant effects.

12.14 We then outline the Applicant's assessment of significant effects, with the issues that arise from that assessment, in the following categories:

- Ground-borne noise and vibration from tunnelling

- Noise and vibration from the construction work sites
- Noise from road and river transport
- Effects on open space from noise during construction.

12.15 We then go on to consider the proposed mitigation measures and in particular:

- whether significant impacts would be avoided, and what on-site mitigation measures have been put forward to avoid and minimise adverse impacts.
- what measures would be in place on-site to control the levels of noise from the surface construction sites.
- the Applicant's off-site noise mitigation proposals for noise insulation and temporary rehousing.

12.16 As required by the NPS, we then consider the impact on health and quality of life from noise.

12.17 We end this chapter of the report with our conclusions against the NPS tests.

POLICY AND GUIDANCE CONTEXT

The NPS

12.18 In accordance with s104 of the Planning Act 2008 (as amended) (PA 2008) the starting point for the consideration of this application is the NPS unless any of the exceptions under s104 (4)-(8) apply.

12.19 With regard to noise, paragraph 1.4.4 of the NPS begins by recognising the following:

'the main negative effects of the NPS are related to noise, landscape/townscape and visual effects and archaeology and cultural heritage. These reflect the fact that the population equivalent threshold in the Planning Act 2008 is likely to limit the geographical location of potential projects to very large conurbations. In consequence, the sustainability effects of the NPS have been considered in the context of new waste water NSIPs [nationally significant infrastructure projects] within a mature urban environment. The development of waste water NSIPs is consequently likely to result in adverse townscape and visual effects within a built up environment with many possible receptors, and in the short term, noise disturbance during construction'.

12.20 The potential for noise and disturbance (including vibration) to have adverse impacts upon health and the need for any such effects to be assessed individually and on a cumulative basis is also recognised under section 3.10. In addition section 3.11 refers to s158 of PA 2008 which confers statutory authority for carrying out development consented by, or doing anything else authorised

by, a Development Consent Order, providing a defence in any civil or criminal proceedings for nuisance. This is only to the extent that the nuisance is the inevitable consequence of what has been authorised. In this connection, paragraph 3.11.2 states that it *'is very important that, at the application stage of an NSIP, possible sources of nuisance under section 79(1) of the 1990 Act and how they may be mitigated or limited are set out by the applicant and considered by the examining authority so that appropriate requirements can be included in any subsequent order granting development consent'*.

- 12.21 Chapter 4 of the NPS addresses generic impacts which will be relevant to any waste water infrastructure. Section 4.9 specifically addresses noise and vibration. It makes it clear that references to noise *'apply equally to assessment of impacts of vibration'* (NPS, para 4.9.1).
- 12.22 Paragraph 4.9.9 under the heading 'Decision making' identifies specific aims that need to be met. It states that the *'decision maker should not grant development consent unless it is satisfied that the proposals will meet the following aims:*
- *avoid significant adverse impacts on health and quality of life from noise;*
 - *mitigate and minimise adverse impacts on health and quality of life from noise; and*
 - *where possible, contribute to improvements to health and quality of life through the effective management and control of noise'.*
- 12.23 Prior to this, at paragraph 4.9.4, the NPS provides guidance to applicants as to what should be included in noise assessments. It directs them with regard to the prediction, assessment and management of construction noise to make reference to *'any relevant British Standards and other guidance which also give examples of mitigation strategies'* (NPS, para 4.9.6).
- 12.24 Under the heading 'Mitigation' the NPS advises at paragraph 4.9.11 that the decision maker should consider whether the applicant's *'proposals for mitigation measures needed both for operational and construction noise (over and above any which may form part of the project application) are acceptable. The decision maker may wish to impose requirements to ensure delivery of these mitigation measures'*. In addition at paragraph 4.9.13 the NPS states that *'In certain situations, and only when all other forms of noise mitigation have been exhausted, the applicant may consider it appropriate to provide noise mitigation through improved sound insulation to dwellings, or, in extreme cases, through compulsory purchase of affected properties in order to gain consent for what might otherwise be unacceptable development.'*

Noise Policy Statement for England

- 12.25 The NPS at paragraph 4.9.1 refers to the Noise Policy Statement for England 2011 (NPSE) and states that it sets out Government's policy on noise. The aim of the NPSE is to *'provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion'*. It sets out the Government's long term noise policy vision supported by noise policy aims. These noise policy aims accord precisely with the three aims set out above under paragraph 4.9.9 of the NPS.
- 12.26 The Explanatory Note to the NPSE at paragraph 2.9 under the heading *'How should the Noise Policy Statement for England be used?'* notes that noise is complex and that *'there are currently no European or national noise limits which have to be met, although there can be specific local limits for specific developmentsUnlike many other pollutants, noise pollution depends not just on the physical aspects of the sound itself, but also the human reaction to it. Consequently, the NPSE provides a clear description of desired outcome from the noise management of a particular situation'*.
- 12.27 The Explanatory Note at paragraph 2.20 under the heading *'What do the aims of the Noise Policy Statement for England mean?'* refers to two established concepts from toxicology that are being applied to noise as a means of measuring its impacts upon health and quality of life and refers as an example to their use by the World Health Organisation (WHO). They are:
- *NOEL - No observed effect level. This is the level below which no effect can be detected.*
 - *LOAEL - Lowest observed adverse effect level. This is the level above which adverse effects on health and quality of life can be detected.*
- 12.28 The NPSE then extends these concepts for its own purpose which it states *'leads to the concept of a significant observed adverse effect level'*:
- *SOAEL - Significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur.*
- 12.29 The NPSE states that it is not possible to give a single objective noise-based measure that defines a SOAEL that is applicable to all sources of noise for all situations. It acknowledges that the SOAEL is likely to be different for different noise sources, for different receptors and at different times.

National Planning Practice Guidance

- 12.30 The National Planning Practice Guidance¹⁶⁵ (NPPG) was published by the Government in its final form on 6 March 2014.
- 12.31 This gives some guidance as to how planning authorities should take account of the acoustic environment and as to the mitigation strategies which should be applied in the levels of the noise hierarchy (ie NOEL, LOAEL and SOAEL).
- 12.32 The NPPG at paragraph 003¹⁶⁶ states that in determining a noise impact authorities should *'take account of the acoustic environment and in doing so consider:*
- *whether or not a significant adverse effect is occurring or likely to occur;*
 - *whether or not an adverse effect is occurring or likely to occur; and*
 - *whether or not a good standard of amenity can be achieved'.*
- 12.33 As to mitigation strategies or actions, the NPPG at paragraph 005¹⁶⁷ under the heading *'How to recognise when noise could be a concern?'* provides a description of the noise exposure hierarchy and how different perceptions of noise have different impacts on behaviour and advises the actions that ought to be taken in each scenario. This is reflected in a table which sets out the following actions when levels of noise could generate adverse effects.
- **Mitigate and reduce** to a minimum where noise is between LOAEL and SOAEL. Noise is described in this category as an **observed adverse effect** which is noticeable and intrusive. *'Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up the volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life'.*
 - **Avoid** where noise is over SOAEL. Noise is described in this category as a **significant observed adverse effect** which is noticeable and disruptive. *'The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep.*

¹⁶⁵ NPPG, published 6 March 2014. The final version was not materially different to the Beta version; there were some changes in the text but no material changes to the noise exposure hierarchy (refer APP197)

¹⁶⁶ Paragraph: 003 Reference ID: 30-003-20140306

¹⁶⁷ Paragraph: 005 Reference ID: 30-005-20140306

Quality of life diminished due to change in acoustic character of the area'.

- **Prevent** noise which is at a further level over SOAEL. Noise is described in this category as an **unacceptable adverse effect** which is noticeable and very disruptive. *'Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory'* (NPPG, table in para 005).

12.34 Like the NPSE, the NPPG does not define the level of LOAEL and SOAEL by reference to objective measures but does state that factors could combine in any particular situation (eg the source and absolute level of the noise together with the time of day (and night), the number of noise events, the frequency and pattern of occurrence of noise, the tonal characteristics of the noise and the existing and planned character of the area).

12.35 It is noted that the NPPG in the subsequent paragraph¹⁶⁸, when considering what factors influence where noise could be a concern, advises that a factor that should be considered is whether closing windows would completely remove adverse internal effects. If this is the case, the NPPG states that a suitable alternative means of ventilation is likely to be necessary when windows have to be kept closed.

12.36 We also note that NPPG paragraph 009¹⁶⁹, states that the noise impact *'may be partially off-set if residents have access to:*

- *a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or;*
- *a relatively quiet external amenity area for their sole use, (e.g. garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;*
- *a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;*
- *a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance)'.*

World Health Organisation

12.37 The WHO goes further than the NPSE and NPPG in seeking to provide some guidance as to suitable internal and external noise

¹⁶⁸ Paragraph: 006 Reference ID: 30-006-20140306

¹⁶⁹ Paragraph: 009 Reference ID: 30-009-20140306

levels. In its document Guidelines for Community Noise (April 1999) looking at noise levels in and around residential properties the WHO state under section 3.4 (page 46): *'if negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dBA indoors for continuous noise. If the noise is not continuous, sleep disturbance correlates best with L_{Amax} and effects have been observed at 45 dB or less. This is particularly true if the background level is low. Noise events exceeding 45 dBA should therefore be limited if possible. For sensitive people an even lower limit would be preferred. It should be noted that it should be possible to sleep with a bedroom window slightly open (a reduction from outside to inside of 15 dB). To prevent sleep disturbances, one should thus consider the equivalent sound pressure level and the number and level of sound events.'*

- 12.38 In Night Noise Guidelines for Europe¹⁷⁰, the WHO provides more guidance on NOEL and LOAEL. Table 3 gives the following health effects for the population for night noise level exposure (average level over a year):
- 30dBL_{night,outside}: equivalent to no observed effect level (NOEL)
 - 40dBL_{night,outside}: equivalent to lowest observed adverse effect level (LOAEL)
 - 40 to 55dBL_{night,outside}. Adverse health effects are observed among the exposed population. Many people have to adapt their lives to cope with noise at night. Vulnerable groups are more severely affected
 - Above 55dBL_{night,outside}. The situation is considered increasingly dangerous to public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep disturbed. There is evidence that the risk of cardio-vascular disease increases.
- 12.39 The WHO does not provide a definition of SOAEL. However, based on these exposure level effects, it does recommend (in table 4) the following maximum night noise guideline values for the protection of public health from night noise:
- Night noise guideline (NNG) L_{night,outside} = 40dB
 - Interim target (IT) L_{night,outside} = 55dB
- 12.40 The interim target (IT) of 55dBL_{night,outside} is recommended by the WHO where the achievement of NNG is not feasible in the short run (WHO Night Noise Guidelines for Europe, page 109). However the Night Noise Guidelines for Europe also note that vulnerable groups cannot be protected at this level.

¹⁷⁰ WHO Night Noise Guidelines for Europe, published 2009

APPLICANT'S OVERALL APPROACH TO NOISE AND DISTURBANCE

General observations

- 12.41 It was clear at a very early stage in the examination that noise and disturbance during the construction of the proposed development would be an area that was both important and relevant.
- 12.42 The Applicant failed to meet some of the deadlines set by the ExA at the outset of the examination (for example the answer to Q29.2 was submitted late). It also submitted late written submissions the day before an IS hearing which did not give sufficient time for Interested Parties to either read or take instructions, eg:
- APP111, APP112 and APP113 submitted on 3 February for the IS hearing on 4 February 2014
 - the noise limits paper APP150 submitted on the 19 February 2014 before the resumption of the adjourned hearing on 20 February 2014.
- 12.43 This was not helpful and only gave Interested Parties a short opportunity to raise their questions on the papers before the next submission date.
- 12.44 The ExA acknowledges that the Applicant did address most of the questions it asked and provided most of the information requested. For example, in the Rule 8 letter (PD006) the ExA asked for noise contours to be provided for each site to assist in our understanding of the context of sensitive receptors in relation to the sites. These were provided. However, the Applicant did not answer the ExA's question on intermittent noise levels and further declined to answer the ExA's question requesting recommended drafting and information in relation to the use of noise limits. This matter is discussed later in this chapter.

Applicant's approach to noise policy

- 12.45 The Applicant's approach to national policy and the hierarchy of noise effects is given in appendix B of the written summary of the IS hearing on 22 January 2014 (APP102.03). The appendix includes table B.1 which provides a summary of the Applicant's interpretation of national policy and guidance (NPPG) in relation to the hierarchy of noise effects and links to the ES and mitigation policy. On 3 March 2014, the Applicant submitted a second paper on NPS noise policy and its implications as appendix A to the written summary of the IS hearing on 20 February 2014 (APP157).
- 12.46 Our understanding of table B.1 is that SOAEL would be equivalent to the proposed threshold for noise insulation at the ES ABC

category C¹⁷¹, and what the trigger level for temporary rehousing would be when an unacceptable adverse effect occurred (APP102.03).

- 12.47 On 11 March 2014, in the covering letter to the final submission (APP197), the Applicant commented on the newly published NPPG, and confirmed that, in the context of noise, it is materially the same as the Beta¹⁷² version. For ease of reference we outline below the Applicant's position with regard to the interpretation of the NPPG. It should be noted that other Parties did not have the opportunity to comment on this final submission by the Applicant.
- 12.48 In APP197 the Applicant states that the published guidance confirms its submissions 'on NPS noise policy (APP102.03, Appendix B, and APP157, Appendix A), the key matters being:
- (a) *NPPG guides how the aims at NPS paragraph 4.9.9 should be interpreted.*
 - (b) *The first aim relates to 'significant observed adverse effects' as defined by NPPG and NPSE (and not to any other definition of significant effect in the Environmental Statement (ES)).*
 - (c) *SOAELs are aligned with the trigger values for noise insulation (or other equivalent off-site mitigation).*
 - (d) *Where on-site mitigation is exhausted, the provision of noise insulation avoids any residual significant observed adverse effects and, therefore, the first aim of NPS noise policy is met.*
 - (e) *The second aim relates to 'observed adverse effects' and these occur when the noise exposure is between the lowest observed adverse effect level (LOAEL) and the SOAEL.*
 - (f) *Observed adverse effects have been assessed in the ES (against the A and B thresholds of the BS5228-1 ABC method) and, taking account of noise level, duration and number of dwellings affected, can be reported as a significant effect in the ES. These observed adverse effects primarily relate to change in the acoustic character of the area and do not cause 'material change in behaviour and/or attitude'.*
 - (g) *The Environmental Impact Assessment and Thames Water's noise strategy has resulted in on-site mitigation being maximised. In maximising mitigation, the residual observed adverse effects are minimised and hence the second aim of NPS noise policy is met.*
 - (h) *NPPG, like NPSE, is clear that avoiding significant observed adverse effects and minimising observed adverse effects (ie, the first and second aims of NPS noise policy) "must be made taking account of the economic and social benefit of the activity causing the noise". In other words, there is a balance*

¹⁷¹ ES ABC category C: Noise category as defined by the ES for day, evening and night. See also BS5228-1 Annex E.3.2

¹⁷² Beta version was the draft current version of NPPG at the time of the IS hearings

to be made and NPS noise policy should not therefore be applied in isolation.

- (i) *Where residents elect to retain the off-site mitigation provided, it will reduce exposure to existing noise sources, thus improving their existing situation over the short and long term and meeting the third aim of NPS noise policy'.*

12.49 We have taken the Applicant's approach into our considerations and in reaching our conclusions on noise and disturbance.

ISSUES RAISED ON BASELINE, PREDICTED NOISE LEVELS AND METHODOLOGY

12.50 This section considers the issues that arose from the baseline survey, the Applicant's prediction of noise and vibration levels, and subsequently the methodologies used by the Applicant to assess significant effects from noise and vibration. We have not reported on all matters, just the issues that we consider need highlighting, although it should be noted that in coming to our conclusions and recommendations we have had regard to all relevant submissions.

12.51 The Applicant's methodologies which have been highlighted below include:

- Residential: methodology for assessment of significant effects from noise at construction sites
- Non-residential: methodology for assessment of significant effects from noise at construction sites
- Transport, road and river methodology, particularly the impact on houseboats.

Baseline surveys at surface construction sites

12.52 Baseline surveys were undertaken by the Applicant at each proposed surface construction site. The location of the measuring points are shown on the site plans in the ES (Docs 6.2.04 to 6.2.27, figure G1) with photographs (Docs 6.2.04 to 6.2.27, appendix G). The Applicant states that, at each site, measurements were taken at locations which are representative of the noise climate at the nearest noise sensitive receptors to the proposed construction areas.

12.53 In some cases the locations of the baseline survey measurement points are disputed by the local authority (eg LB Tower Hamlets with regards to King Edward Memorial Park Foreshore) and by local residents (eg Elm Quay Court, at Heathwall Pumping Station, and the houseboats at Kirtling Street and Chambers Wharf). This is because they consider that the resultant ambient noise levels measured do not accurately represent the nature of their environment (which in their view is quieter).

- 12.54 However, we consider that as a planning tool, the survey was adequate for assessing the broad impact of the overall project and for the purposes of reporting in the ES.
- 12.55 What does cause us concern is where it is proposed that the baseline survey would be used as a tool to determine eligibility for noise insulation by predicting the ambient noise level at dwellings. The BS5228 example trigger level for insulation suggests that ambient noise levels are '*predicted or measured at a point 1m in front of the most exposed of any windows and doors in any façade of any eligible dwelling*'¹⁷³. Our concern is that the prediction used in the ES (from the baseline survey) may not be sufficiently accurate in all cases and that a better understanding of the change in noise environment and perception of observed effects would need to be obtained.
- 12.56 An example is the residential receptors near the Heathwall Pumping Station site. These are all predicted in the ES to have night-time ambient noise levels of 62dBL_{Aeq} or more. As a result, it has been predicted by the Applicant that these receptors would experience no significant effect, even though at three receptors night-time construction noise level is forecast to be between 62dBL_{Aeq} and 67dBL_{Aeq}. During the examination, the assessment of the baseline for one of these properties near Heathwall Pumping Station was disputed by one of the flat owners at Elm Quay Court. This was because the baseline measurement had been taken at road level and, in the resident's submission, did not represent the quieter nature of the façades of the properties overlooking the river.
- 12.57 At the request of the ExA the actual ambient noise level at one of the flats was measured. The ES had given the assumed ambient noise level in day/evening/night-time at the flats as 68/65/62dBL_{Aeq} (Doc 6.2.15, table 9.4.1). However the measurement by the Applicant recorded the ambient reading¹⁷⁴ at one of the flats as 61/60/50dBL_{Aeq} (APP167, table 6.1, answer to R57.6). This changes the night noise ambient from 7dB above the night-time noise trigger level for noise insulation to 5dB below.
- 12.58 Similarly, the Applicant's measurement at Downings Roads Moorings (near Chambers Wharf) changed the ambient noise level from 64/54/47dBL_{Aeq} in the ES to 56/56/43dBL_{Aeq} in the ES Update Report (APP208.01, table 20.2). Although this did not change the eligibility of the houseboats for noise insulation, it is relevant when considering the significance of the effect on the houseboats from construction and transport¹⁷⁵.

¹⁷³ BS5228 -1 :2009+A1:2014: annex E, table E.2

¹⁷⁴ measurement corrected for façade

¹⁷⁵ ABC category in daytime, changes from B to A

- 12.59 In these cases, the measured night-time ambient noise level at the receptor was between 12dB and 4dB less than assumed in the ES. As discussed later, the ambient levels have a direct bearing on whether a property is eligible for noise insulation. Therefore we consider that the accuracy of the baseline, in relation to the sensitive receptor, is important in order to ensure that properties would be adequately protected from excessive noise should the development proceed.
- 12.60 LB Tower Hamlets submitted its own baseline measurements for King Edward Memorial Park and at individual flats in Free Trade Wharf (FTW) (REP096). In the case of FTW north these showed a lower ambient level of 71.7dB_{L_{Aeq}} (day-time) whereas the ES predicts a 78dB_{L_{Aeq}} ambient noise level. The Applicant responded to the submission from the Council (APP31.04, para 6.3.7 to 6.3.12) and revised the ABC impact threshold level in the ES Update Report.
- 12.61 Notwithstanding the above, we note that the Temple Group carried out its own baseline monitoring around Axis Court at Chambers Wharf (APP116.14, para 3.3.7). The measured levels in the evening are understood to be consistent with the Applicant's assessment and levels at night were higher than the Applicant's assessment. We are not therefore suggesting that the baseline is inaccurate as a general description. Rather, our view is that it may not be an accurate representation of the ambient noise level at each and every receptor. In the case of Chambers Wharf, the Applicant has agreed to carry out a further 12 months of baseline monitoring before commencement of construction. Whilst this would be secured in the Code of Construction Practice (CoCP) Part B, there is no requirement for the local authority to approve the location of the baseline monitoring points.
- 12.62 We raised this generic issue in the IS hearing on 20 February 2014 where we asked the Applicant whether the ambient levels, at both existing properties and new properties, would be measured before commencement of construction. We were advised by the Applicant that future noise monitoring (during construction) would include the same measuring positions as had been used in the application assessment. The Applicant did not plan to reassess the pre-construction ambient noise levels at sensitive receptors and representative façades. We return to this subject later in this chapter under the heading 'off-site mitigation'.

Predicted noise levels from construction

- 12.63 Predicted noise from surface construction activities have been calculated using the approach in BS5228: 2009, Part 1. This section is looking at the predicted noise level only. The impact of the predictions is discussed later under the section on methodology.

- 12.64 The NPS details what the Applicant should include in the noise assessment (NPS, para 4.9.4). The Applicant has provided a table (Doc 6.2.02, table 9.3.1) detailing where it considers that the application complies with this requirement. We would agree that the Applicant has addressed most of the NPS assessment requirements. However, in our view there are some omissions.
- 12.65 NPS paragraph 4.9.4 requires that the Applicant's noise assessment should include the '*identification of any distinctive tonal, impulsive or low frequency characteristics of the noise*'. The application did not provide this information. This was not an oversight and the Applicant sets out the reasons for the approach taken in the ES (Doc 6.2.02, table 9.3.1).
- 12.66 Noise levels at receptor points near the surface work sites have been assessed and presented in the ES as $dB_{L_{Aeq}}$ for daytime, evening and weekends, and night (Doc 6.2.04 to 6.2.27, chapter 9 for each site). The noise levels are presented as a range of noise levels with a typical monthly¹⁷⁶ noise level at each receptor.
- 12.67 However, our concern from this presentation of typical monthly noise levels is that despite the nature of the works, which in places includes demolition and piling, there is no indication before us of intermittent noise levels or any distinctive tonal, impulsive or low frequency noise.
- 12.68 We are also concerned that these monthly noise levels have the potential to mask high peak noise levels on a daily or hourly basis, which may have a significant effect on receptors. Others also commented on this aspect particularly with regard to the impact on health and wellbeing, for example Carnwath Road Coalition (REP186) and Free Trade Wharf Management Company¹⁷⁷.
- 12.69 We asked in the ExA's Q11.5 for the Applicant to provide '*an assessment of peak noise levels and number of incidences that will be experienced at all noise receptors at each site in the three time periods: standard working hours, extended working hours and night*'. The Applicant appeared to misinterpret the request and instead provided the examination with potential peak construction noise levels ($dB_{L_{Aeq}}$) for '*short periods when construction noise levels could be greater than the monthly worst case noise levels used for the assessment*' (APP11, para 5.1.3).
- 12.70 In view of the lack of a clear answer, we asked the Applicant (in the ExA's second written question Q29.8), to provide information on the expected worst $dB_{L_{Aeq(1-hour)}}$ which would be experienced during standard working hours and extended hours and the expected worst $dB_{L_{Aeq(5-minutes)}}$ at night.

¹⁷⁶ Typical monthly construction noise level: the most frequently occurring monthly construction noise level during works (as defined in ES)

¹⁷⁷ IS hearing 5 February 2014

- 12.71 The Applicant declined to provide this information and stated that the measures ($\text{dBL}_{\text{Aeq1-hr}}$ and $\text{dBL}_{\text{Aeq5-mins}}$) typically relate to BS4142, which is used for operational noise assessments. The Applicant considered that while BS5228-1 (the method used for the assessment at the construction sites) notes the time periods associated with these measures in general terms, and stated that there is no precedent for applying these periods to the assessment of construction noise for projects of a similar magnitude, intensity and duration to this project (APP56). We return to this point later in the discussion on methodology.
- 12.72 We understand the limitations of BS5228 and the assessment of noise levels from construction sites. However, on this project, not only will many of the sites be active for long durations (up to six years), but also 16 of the sites would have protracted periods of night-time working. Indeed, night-time working for periods of up to three years is expected at each of the three main drive sites. This lengthy duration makes the interpretation of the assessment for noise impact particularly critical when considering impacts on health and quality of life. At present we have no information on the impulsive or maximum noise levels that might be expected from the sites - this is discussed further in this chapter under the section heading 'noise limits'.

Residential: methodology for assessment of construction effects

- 12.73 The methodology used by the Applicant for the assessment of significant effects on residential receptors is an area of dispute raised in particular by the local authorities.

BS5228 ABC Method 1 - ES Modified

- 12.74 The Applicant assessed the significance of the effect of noise from construction on residential receptors by using a modified version of the BS5228 ABC method¹⁷⁸.
- 12.75 The Applicant modified the BS5228 ABC method as follows:
- Firstly the BS5228 derived criteria were used to identify impacts that could potentially cause significant effects at residential receptors
 - Then a further stage was applied: whether or not the Applicant considered the effect would be significant was assessed using professional judgement.

¹⁷⁸ BS5228-1:2009+A1: 2014. Code of practice for noise and vibration control on construction and open sites. Part 1 Noise. The ABC method is example method 1 (for the assessment of the significance of noise effects) given in Annex E.3.2. The +A1:2014 version corrects errors in the 2009 version, and amongst other aspects clarifies that noise for the ABC methodology should be taken as construction noise and not total noise. The +A1 version was published in February 2014, during the examination, however the Applicant had pre-sight and had undertaken the assessment with the errors corrected

- 12.76 The Applicant's professional judgement was described as being based on a number of factors (Doc 6.2.02, para 9.5.43 to 9.5.51):
- Design of the receptors (ie whether sound insulation provided by windows is likely to be sufficient to reduce internal noise levels to a reasonable level)
 - The number of receptors
 - The proportion of the community subject to the impact
 - The existing absolute noise levels
 - The duration of the impact (if the duration of the noise impact was for a month or less, that would not necessarily be assessed as significant).
- 12.77 Of particular note, the Applicant applied the night-time Interim Target (IT) threshold value of 55dBL_{night,outside} contained in the WHO Night Noise Guidelines for Europe. At noise exposures below the WHO night-time IT, the degree of impact relative to the baseline situation and the absolute resulting noise level were also considered (Doc 6.2.02, paras 9.5.49 to 9.5.51).
- 12.78 However, we consider that the extensive use of professional judgement and the number of errata has made it difficult to determine if the assessment was undertaken on a consistent basis across the whole application area.
- 12.79 The BS5228 ABC methodology states that when a potential significant effect is indicated, *'the assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect'*. We asked the Applicant at the IS hearing on the 4 February 2014 where we might find this analysis in the ES or other submitted documentation. The Applicant responded that it considered that the character of the impact is already taken into account by the application of the BS5228 ABC method.
- 12.80 We can find no reference in the Applicant's assessment and evidence to the examination to the character of the noise, consideration that an impact may be greater because of the duration of the noise impact (either in the daytime or at night), or the impact of the duration on restricted use of private open space (eg balconies or gardens). Neither is there any separate identification of any distinctive tonal, impulsive or low frequency characteristics of the noise (as required by the NPS paragraph 4.9.4).
- 12.81 The Applicant appears in reality to have limited the factors it considered, once the potential for a significant effect had been identified, to whether potentially significant impacts could be reduced through closing windows, or partly closing windows, and whether the noise impact would be for less than one month.

- 12.82 LB Tower Hamlets in its LIR (REP096, para 5.7.3.1) questioned the modification of the ABC method *'by adding a further assessment of the possible internal levels at premises where the 'ABC' thresholds for significant effects are exceeded. It is not clear why the BS5228 methodology has been modified for the purposes of the ES'*. It further states that *'the modification of the 'ABC' method in this manner, to consider possible internal noise levels from the construction works, is considered inappropriate and likely to have caused an underestimation of significant effects'*. The Council addresses this issue in more detail in its written representation where it points out that *'whilst it may be possible that the internal noise level guidelines of BS 8223 might not be exceeded, there can still be a significant effect on the environment due to erosion of the acoustic amenity caused by substantial increases in noise'* (WRR097, section 3.6).
- 12.83 At the IS hearing on 20 February 2014, the Applicant stated that the assessment for night-time noise, as set out in the assessment methodology (ES, volume 2, section 9) is *'based on having windows open during times of the year when people would naturally tend to have their windows open'* (eg during summer months) and that the assessment of significant observed effects at night takes account of windows being open (APP157, section 3.3).
- 12.84 BS5228 does not suggest that the assessment for significant impact should consider possible reduction of noise levels through the building façade, open or closed windows. Also, the ES has presumed a specific noise insulation standard for the building envelope for each affected building with both windows open and closed. This required a range of assumptions regarding acoustic properties of windows, façade construction and available ventilation which in practice would differ between dwellings. We therefore remain concerned by the ES reduction in reported significant effects by the consideration of internal noise levels. This is of particular concern because of the long duration of many of the construction sites and extent of night-time working, and the implications for health and well-being.

BS5228 ABC Method 1 - Pure

- 12.85 In view of our concerns and LB Tower Hamlets representations about the underestimation of significant effects, we asked the Applicant in ExA's Q29.1 to provide an assessment of significant effects at the external façades of all receptors. The Applicant responded to this request and included plans which show the potentially affected façades in answer to Q29.1 and Q29.4 (APP56.04.01 to APP56.04.13).
- 12.86 The difference in the outcomes between the application of the two methodologies, BS5228 ES Modified (as used in the application)

and BS5228 Pure¹⁷⁹ (at the external façade, as given in answer to Q29.1) is given in APP167 in answer to the ExA's R57.14. The tables (table 14.1 to 14.23) show that, if the assessment had been undertaken in accordance with BS5228 at the property façades, then over 20 additional receptors (including blocks of flats) would be subject to a significant effect.

- 12.87 We also note that in the noise assessment, where the baseline noise survey measured the night-time ambient noise level as over 55dBL_{Aeq,T}, then the higher level of ambient noise is used as the ABC threshold for level of significance. This does not seem unreasonable to us, but, as discussed earlier in this report, it is dependent on the baseline being accurate and representative of the ambient noise level at the property.

Use of BS5228 Method 2 (+5dB)

- 12.88 Method 2 (+5dB) is an alternative method given in the BS5228 for measuring potential significant impact. It assesses noise levels as potentially significant *'if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5dB or more, subject to lower cut-off values of 65dB, 55dB, and 45dBL_{Aeq,T} from site noise alone, for the daytime, evening and night-time periods respectively; and a duration of one month or more'*.
- 12.89 LB Tower Hamlets states in its written representation (WRR097, section 3.6.4) that the Council would prefer the assessment of significance of noise impact to be undertaken using the BS5228 method 2¹⁸⁰. This is because it *'specifically applies to works of more than one month duration and to a wider range of potentially affected premises than the 'ABC' method (which applies to dwellings only) including the assessment of construction noise impacts on open spaces (such as KEMP) as well as residential housing; hotels and hostels; buildings in religious use; buildings in educational use; and buildings in health and/or community use'*. The same representation further notes that method 2 is *'more akin to the Crossrail methodology which takes into account the pre-construction ambient plus construction noise'*.
- 12.90 LB Southwark also explained (at the IS hearing on 5 February 2014) that it considers that, while the ABC methodology is helpful at project level for project planning purposes, the sensitivity of the approach needs to be tested when considering mitigation measures. The Council's view is that, given adequate data on the ambient noise levels, method 2 (+5dB) would give a more

¹⁷⁹ BS5228: Pure: as referred to by the Applicant in APP167. ie impact at the façade of a property in accordance with the BS method (and unmodified)

¹⁸⁰ BS5228-1: 2009+A1:2014; Annex E.3.3, Example method 2 - +5dB(A) change. The March 2014 amendments to the 2009 edition include use of the term site activities instead of construction activities, potentially significant replaces significant in the first paragraph, and residential buildings instead of residential housing in the second paragraph

representative view of what the actual impact on householders would be - for example, would their sleep be disturbed or could they open their windows?

- 12.91 We asked in ExA's Q29.2 for the Applicant to provide us with an assessment using method 2 (+5dB). The Applicant declined to undertake this exercise as it *'concluded that BS assessment method 1 was entirely appropriate for this project' and 're-assessment using another method (method 2), where the assessment outcomes would be different would not assist the examination process'* (APP56, section 2.1).
- 12.92 The Applicant did however follow up with a more detailed response on 24 January 2014 (APP97), which gave comparisons for six key sites (the three main drive sites, Shad Thames Pumping Station, King Edward Memorial Park Foreshore and Bekesbourne Street). The comparison shows the differences between the +5dB change method, the BS5228 (Pure) ABC method and the ES (modified) ABC method, for the ES (tables 1a to 6a), including further mitigation identified since submission of the application (tables 1b to 6b).
- 12.93 We note from this data that the method of assessment should make no difference to eligibility for noise insulation or temporary rehousing. However, it would make a noticeable difference to the Applicant's acknowledgement that some properties might experience a significant impact eg Wheat Wharf at Shad Thames Pumping Station, would experience a 16dB increase in dBL_{Aeq} in daytime. This is considered not to be a significant effect in the ES, but would be significant if the BS5228 Pure method or method 2 (+5dB) were used.

Summary

- 12.94 At the IS hearing on 20 February 2014, LB Tower Hamlets, LB Southwark and LB Wandsworth all stated that they would have preferred the assessment to have used method 2. LB Wandsworth also noted that it considers that method 2 would have provided a better outcome for residents.
- 12.95 However, in its SoCG, LB Southwark confirms that *'there is no basis for challenging, in-principle, the base ABC method assessment from BS5228:1997 used in the Environmental Statement as other major London infrastructure projects have set successful precedents'*. However, the Council does go on to state that the use of the extension to the ABC method, *'taking account of sound insulation of buildings and therefore considering indoor levels against relevant standards is not accepted'*. The Council considers that *'using this method appears to have underestimated the noise impacts on the adjacent residential properties and underestimates the number and distribution of premises likely to*

be affected by airborne noise' (APP116.14, para 3.3.8 and APP159.02).

- 12.96 We understand the view of the local authorities that the use of a simpler methodology would have been easier for all to understand. Notwithstanding this, we consider that use of the BS5228 ABC method (as defined in BS5228) is adequate for planning purposes.
- 12.97 However, the Applicant's modification of the method, extensive use of professional judgement and the assumption that the significant effect impact should be determined at the inside of the properties and not at the façade, results in an assessment that does not take into account the impact on the external environment of residential receptors (including gardens and balconies). We consider that this is likely to have resulted in both an underestimate of impacts on those that have been identified as having a significant effect and an underestimate of the number of receptors experiencing a significant effect.

Non-residential: methodology for assessment of construction effects

- 12.98 The ES stated that the methodology for noise and vibration for non-residential noise sensitive receptors was on a receptor-by-receptor basis, using established impact criteria, relevant guidance documents and professional judgement (Doc 6.2.02, para 9.5.52).
- 12.99 The basis for the assessments for non-residential receptors was not clear to us, so we asked for clarification in Q11.16. The Applicant's response (APP11) confirmed that its assessment had firstly determined if construction noise would be greater than ambient noise levels. It had then assessed internal noise levels against guidance levels and duration. The guidance used was BS5228 (for construction noise levels), PPG24¹⁸¹ (typical noise transmission through the façade), BS8233 (internal noise level) and BB93 (internal guidance design levels for schools) (APP11, tables 16.1 to 16.23).
- 12.100 We noted the number of schools in the areas around the surface work sites and requested a more detailed analysis of the noise impact. We asked in ExA's Q11.6, for an assessment of the $dBL_{Aeq(30\text{-minutes})}$ total noise levels (ambient plus construction) for each school within 300m of the nearest boundary of the sites. The Applicant's answer (APP11, table 6.1), provided this information and identified schools where the total noise levels exceed the ambient by 3dB or more (ie construction noise level is equal to or greater than ambient) (APP11, table 6.1 and para 6.1.4).

¹⁸¹ PPG24, which was subsequently superseded by the National Planning Policy Framework in March 2012, was extant at the time of the preparation and submission of the application

River traffic: methodology for assessment of noise

- 12.101 The Applicant's methodology for the assessment of significant effects from construction river traffic is considered below. In particular, the assessment of water-borne noise on houseboats was a subject which attracted a number of written representations from Interested Parties and oral representations at the OF hearings¹⁸². Having regard to the level of representations, a number of questions were asked on this subject and it was one of the matters raised at the noise IS hearing.
- 12.102 Separate assessments are provided in the ES for the effects from road construction traffic and river construction traffic (eg tugs, barges and ships). The criteria used for both the road and river traffic assessments, is that no significant effect is experienced at less than 3dB change, and a potentially significant adverse effect may be experienced at levels over 3dB change (Doc 6.2.02, table 9.5.4).
- 12.103 There is no in-combination assessment with construction activities. The Applicant, in answer to Q29.1 stated that *'BS5228 only makes reference to the prediction and assessment of HGVs when they are moving around the site, for example on 'haul roads'. The two sources should be considered separately, partly because there are different legislative controls that apply to noise effects from on-site activity and off-site activity (eg, changes in traffic on existing transport corridors be they road, or river)'*.
- 12.104 We agree with this but consider that the assessment of noise from barges moving on and off the proposed jetties and campsheds is a potential issue at certain sites, particularly those with houseboats nearby (see below).
- 12.105 In addition, as the assessment is based on a change methodology, the accuracy of the baseline and relevance to the receptors against which the assessment is being made, is of particular importance.

Houseboats: methodology for assessment of river traffic impacts

- 12.106 There are five sets of houseboats close to surface construction sites which could be affected by river traffic¹⁸³. They are at:
- Putney (near Putney Embankment Foreshore)
 - Nine Elms Pier (near Kirtling Street)
 - Tideway Village (between Kirtling Street and Heathwall Pumping Station)

¹⁸² OF hearings: 22 November 2013, 23 November 2013, 3 February 2014, 5 February 2014

¹⁸³ Note: the noise impact from unloading and loading of boats is considered by the Applicant under construction noise assessment

- Downings Roads Moorings (upstream of Chambers Wharf)
- Hermitage Community Moorings (on the opposite river bank and just upstream from Chambers Wharf).

12.107 The Applicant considered noise effects from the loading of barges within the ABC methodology for construction site effects. Movement of barges was considered under the traffic assessment. For river traffic the assessment assumed that engine noise would be limited to 75dB(A) at a distance of 25m (Doc 6.2.14, para 9.5.87). As this limit was stated by the Applicant to refer to a Port of London Authority (PLA) Draft Thames Freight Operations Vessel Standard, we would assume that this refers to an air-borne noise limit at 25m rather than water-borne noise, which has different characteristics.

12.108 We asked about noise transfer through steel hulls in ExA's Q11.22, albeit for a non-residential boat. The Applicant answered that *'there is no such effect as the reverberating nature of noise transfer through the hull of a steel ship'* (APP11).

12.109 Nick Lacey¹⁸⁴ submitted a report by Rupert Taylor (REP194, dated 2 December 2013), which considers the implications of applying the ES methodology to the particular case of the houseboats at Downings Roads Moorings. It also refers to the phenomenon of how noise from engines and other sources below surface may not be radiated appreciably into the air, but can be transmitted with relatively little energy loss over long distances underwater. This might mean that there is an additional pathway for noise from river transport associated with the construction in relation to the houseboats. The report also considers the issues with regard to consideration of internal noise level as a measure of significant effect for structures that are not 'typical dwellings'. Although the report is about Downings Roads Moorings, its observations are equally applicable to the other houseboats listed above.

12.110 Written representations and statements at the OF and IS hearings (eg 22 November 2013 and 20 February 2014) from houseboat owners repeatedly asked the Applicant to consider the impact of water-borne noise, particularly below deck. Houseboat occupiers advised us that they experience noise effects when boats pass. They were particularly concerned about noise from engines and propellers resulting from construction river traffic manoeuvring close to their homes (WRR077, REP194, and REP452). They also spoke about the vulnerability of the houseboats to impact from construction traffic either from the barges or manoeuvring tugs (eg REP194).

12.111 The Applicant, in the written summary of the IS hearing on 20 February 2014, provided:

¹⁸⁴ On behalf of the Tower Bridge Yacht & Boat Company Ltd and the residential community at Tower Bridge Moorings at Downings Roads

- An assessment of the distance of the barge operations to the houseboats at Nine Elms Pier (APP157, Appendix D), which confirmed that the distance from the outside of the jetty to the houseboats would be approximately 40m, and the distance to the LLAU¹⁸⁵ from the outer barges would be 7m. However, the assessment did not give the distance from the houseboats to barges that would use the inside of the jetty; which had been one of the points made by the Interested Party at the hearing.
- Clarification of the Applicant's assessment of air-borne and water-borne noise effects (APP157, Appendix E), the traffic assessment criteria in table E1 and the assessments of traffic noise levels. These confirmed that change of noise of less than 3dB is predicted and would be considered to have no significant effect.

12.112 However, these submissions do not resolve our concern that the characteristics of the way noise travels underwater, and the effects this might have on a houseboat receptor, had not been fully taken into account in the assessment.

12.113 We requested in the ExA's R57.16 that an assessment of water-borne noise and vibration impacts be undertaken for all five sets of houseboats. The Applicant's answer in APP167 gave its approach to the assessment of air-borne and water-borne noise, but this did not answer the question about water-borne noise from an underwater source (eg noise from boat propellers and/or engine noise).

12.114 The Applicant has now agreed to undertake further survey work at the houseboats. The survey scope was sent to Mr Hale of Nine Elms Pier on 6 March 2014 (APP198.31) but the survey was not completed before the end of the examination.

12.115 There is a difference of view between the Applicant's noise consultants and the occupiers of houseboats regarding the nature of noise effects on houseboats. We see no reason to doubt the accounts given to us by those with direct experience of living on the river and we attach weight to those accounts. This leads us to conclude that the noise assessment methodology did not take full account of the impact of water-borne noise from underwater sources, ie either piling or construction traffic.

Summary on baseline, predicted noise level and methodologies

12.116 We appreciate that the proposed development is a large and complex project covering multiple sites and different types of receptors. Consequently, the noise assessment is extensive.

¹⁸⁵ LLAU: limits of land to be acquired or used

12.117 However, the extensive reliance on the use of professional judgement as an analytical tool makes it difficult to understand all the data, and for us to be assured that the conclusions have been arrived at on a consistent basis. In summary our views on the matters of baseline, predicted noise levels and methodologies are that:

- We consider that the noise baseline, although adequate for planning purposes, would need to be updated before the works commence on each site to ensure that the impact of noise at each sensitive receptor could be adequately minimised and mitigated. The reasons for this are discussed later in this chapter under the heading 'off-site noise mitigation - baseline issue'.
- The predicted noise levels at each site have been presented in the ES as monthly data, with predictions for day, evening and night. However we have no information on distinctive tonal, impulsive or low frequency noise levels as required by NPS paragraph 4.9.4. In particular, as the noise has been presented as monthly dB_{LAeq} , we do not have an indication of the intermittent noise levels that may be experienced by receptors.
- We consider that the ABC methodology as defined in BS5228 for assessment of impact on residential properties is an acceptable methodology to use. However, by modifying it as discussed above we consider that the Applicant is likely to have understated the potential impact on residential properties and therefore the potential harm from the development.
- From the information before us, we do not consider that the noise impact on houseboats from water-borne sources (eg underwater noise from boat propellers and engines and/or piling) was adequately assessed. Whilst the Applicant agreed to undertake further surveys, the methodology for them was only sent to the houseboat owners on 6 March 2014, just before the completion of the examination. This data is not before us.

APPLICANT'S ASSESSMENT OF SIGNIFICANT EFFECTS

12.118 NPS paragraph 4.9.9 requires that the decision maker should not grant development consent unless it is satisfied that the proposals meet the aims '*avoid significant adverse impacts on health and quality of life from noise*' and similarly '*mitigate and minimise adverse impacts on health and quality of life from noise*'.

12.119 The Applicant's assessment of significant effects is as defined in the ES and the ES Update Report¹⁸⁶. The term 'significant' effect in the ES does not read directly across to the term used in the NPS,

¹⁸⁶ APP208.01 with appendices APP208.01.01 to 208.01.33

ie 'significant adverse' and 'adverse'. The assessment takes into account the additional mitigation measures which the Applicant proposed during the examination and are now included in the site-specific requirements and/or CoCP Part B.

12.120 In this section we report on the extent of the significant effects (as defined by the ES), with on-site mitigation measures in place, from noise and vibration during construction in the following categories:

- Ground-borne effects from tunnelling
- Surface work sites
- Road and river traffic
- Impact on open space.

12.121 How significant effects could be avoided and/or minimised and what mitigation has been proposed is discussed later in this chapter under the heading 'mitigation measures'.

Ground-borne noise and vibration from tunnelling

Ground-borne noise - residential and non-residential receptors

12.122 The Applicant's noise assessment for ground-borne noise from tunnelling activities gives 180 residential receptors as having a 'medium significant impact' with another 180 experiencing a 'high significant impact'. However, the impact would not be experienced for more than six days at any residential receptor as the Tunnel Boring Machine (TBM) passes. Therefore in the ES there is no significant impact assessed. We agree that this approach seems reasonable because of the short duration of the impacts.

12.123 Similarly, non-residential receptors would have a limited time duration exposure to the TBM passing and these have also been considered to have no significant impact (ES, volume 3, table 9.5.3). We accept this conclusion.

Ground-borne vibration - residential receptors

12.124 The Applicant's analysis for ground-borne vibration from tunnelling states that the predicted vibration dose value (VDV) at receptors would be as follows:

- During daytime, all the receptors fall within or below the 'low probability of adverse comment' band (VDV of $0.2-0.4\text{ms}^{-1.75}$) and therefore significant effects are not anticipated.
- At night-time, the predicted VDV's for the majority of receptors fall within or under the 'low probability of adverse comment' band (ie $0.1-0.2\text{ms}^{-1.75}$). 350 receptors along the Greenwich tunnel route are predicted to fall within the 'adverse comment possible range' (ie $0.2-0.4\text{ms}^{-1.75}$).

However properties would be subject to this value for less than one week.

- 12.125 In view of the short duration, the Applicant considers that the impact from vibration would not be significant. We agree.

Ground-borne vibration - non-residential receptors

- 12.126 The potential impact of vibration at very sensitive non-residential receptors was assessed on an individual basis. Panoramas Antenna (over the Frogmore Tunnel) was assessed as having a significant impact. There is also a list of seven 'very vibration sensitive' receptors (including London Bridge Hospital) for which the detailed assessments were outstanding at the time of the ES. A significant effect was assumed in the absence of further information (Doc 6.2.03, para 9.5.42). We asked in ExA Q11.11 for an update, but the Applicant advised us that, apart from British Grove Studios, it had received no further responses from these receptors.

- 12.127 No further information is given in the ES Update Report, so in the absence of any additional information to the contrary we assume that there are eight very sensitive receptors which would be exposed to a significant effect from ground-borne vibration.

Ground-borne vibration - building damage

- 12.128 The ES forecasts that there would be no building damage from ground-borne vibration originating from either the TBM or the temporary construction railway (Doc 6.2.03, paras 9.5.34 to 9.5.36).

Significant effects from noise and vibration at surface work sites

- 12.129 This section reports on the significant effects of noise and vibration from construction at the 24 work sites. We are particularly concerned about the significant effects from noise and vibration because of the long duration of construction at many of the work sites, and the potential for significant impacts on health and quality of life from noise.

- 12.130 We note that the number of properties predicted to have a significant effect has reduced, from that assessed in the ES that accompanied the application, as a result of the additional mitigation measures that the Applicant proposed should be added through the course of the examination. This section gives the net significant effects, assuming the on-site mitigation is in place as proposed and secured through the site-specific CoCP Part Bs.

- 12.131 To put the assessments in context we set out below a summary of the durations of the construction work at the sites as indicated by the Applicant.

Duration of work and night-time working

12.132 The expected duration of work at each site is given in the Applicant's noise assessments, with the period of night-time working given, site by site, in the site-specific ES volumes (eg continuous working at Kirtling Street is given as 37 months in Doc 6.2.14, para 9.2.6c).

12.133 The longest durations on site are for the main drive sites:

- Carnwath Road Riverside: 6 years including 29 months continuous working¹⁸⁷
- Kirtling Street: 6 years including 37 months continuous working
- Chambers Wharf: 6 years including 33 months continuous working
- Greenwich Pumping Station: 5½ years including 28 months continuous working.

12.134 Of the remaining sites, 12 also have periods of night-time working in order to construct the connection tunnels. These are typically for periods from three to nine months. Seven work sites do not have any proposed periods of night-time working (King George's Park, Blackfriars Bridge Foreshore, Shad Thames Pumping Station, Earl Pumping Station, Deptford Church Street, King Edward Memorial Park Foreshore and Bekesbourne Street).

12.135 For each receptor the average monthly daytime noise level is given in graphical form in appendix G2 (Doc 6.2.04 to 6.2.27). These graphs are helpful in that they show the average monthly daytime noise levels (dBL_{Aeq}) throughout the construction period against the ABC criteria. However, they do not show night-time noise levels.

Noise at residential receptors

Applicant's assessment of significant effects

12.136 The Applicant's prediction of significant effects at residential receptors, due to noise from construction works, has been updated to include the additional mitigation measures proposed during the examination. This is included in the ES Update Report (APP208.01 with appendices). The list below indicates the properties that have been predicted by the Applicant as having a significant effect from noise.

- Hammersmith Pumping Station: two blocks of new development flats
- Barn Elms: one block of residential flats

¹⁸⁷ Continuous working: 24 hours a day, 7 days a week

- Putney Embankment Foreshore: two houseboats and ten residential houses
- Cremorne Wharf Depot: Station House and two blocks of new development flats
- Kirtling Street (main drive site): 21 houseboats at Nine Elms Pier, five of which are proposed to be relocated
- Shad Thames Pumping Station: two blocks of residential flats, which are converted warehouses
- Chambers Wharf (main drive site): two blocks of residential flats
- Earl Pumping Station: three blocks of residential flats and one set of terraced houses
- King Edward Memorial Park Foreshore: one block of residential flats
- Bekesbourne Street: one block of residential flats.

12.137 In addition residential properties at Carnwath Road Riverside and Chambers Wharf are reported to be impacted by transport noise (see transport impact section below).

12.138 The ES Update Report also identifies approximately 11 significantly affected receptors where noise levels are predicted to be at such a level that they would be eligible for noise insulation, and approximately six receptors which may be eligible for compensation. However, we also note there are other receptors where the predicted noise level would be at or above the noise insulation levels (ie SOAEL), but which have not been assessed as significant in the ES because of predicted high ambient noise levels¹⁸⁸. This latter point is discussed later in this chapter under the heading 'baseline issue'.

12.139 We highlight below properties from the above list which would either have extended periods of significant effects or night-time significant effects, as defined by the ES method.

12.140 At Kirtling Street the houseboat community at Nine Elms Pier is predicted to experience a typical monthly noise level, in daytime, evening and night of 68dB_{L_{Aeq}}. The ABC criterion is predicted to be exceeded for a period of 22 months in the evening and night-time and three months in the daytime (APP208.01, table 9.5.1). Although there are 21 houseboats, many are occupied by multiple households and our understanding is that over 50 households live on the houseboats (APP56, answer to Q29.3, table 3.1).

12.141 Chambers Wharf is bordered on three sides with residential blocks of flats. Additional mitigation proposed during the examination has reduced predicted noise levels and the predicted significant effects have also reduced (APP208.01, table 20.4):

¹⁸⁸ Source: ES, ES Update Report and APP11, answer to Q11.5

- Luna House: 4 months with typical monthly daytime noise levels of 70dB_{L_{Aeq}}, 47 properties. The additional mitigation measures have removed 29 months of evening and night-time significant effects.
- Axis Court: 4 months with typical monthly daytime noise levels of 65dB_{L_{Aeq}}, 59 properties. The additional mitigation measures have removed 29 months of night-time significant effects.

12.142 Earl Pumping Station is also close to residential receptors. However, there were no changes to the assessment findings as a result of further mitigation. The following residential blocks would have a significant effect in the daytime only. No night-time working is proposed (APP208.01, table 22.2):

- 1-39 Chilton Grove: 48 months with typical monthly noise levels of 70dB_{L_{Aeq}}, 39 properties
- 108-136 Chilton Grove: 48 months with typical monthly noise levels of 71dB_{L_{Aeq}}, 24 properties
- 52-62 Croft Street: 13 months with typical monthly noise levels of 62dB_{L_{Aeq}}, 5 properties
- Cannon Wharf block J: 19 months with typical monthly noise levels of 65dB_{L_{Aeq}}. New development not yet built.

12.143 Another property that would have significant effects over a long period is Free Trade Wharf (South) at King Edward Memorial Park Foreshore. The ES Update Report predicts that daytime construction noise levels would range between 80 and 63dB_{L_{Aeq}}, and the noise levels would exceed the ABC criterion for approximately 24 months (during the daytime). The worst case predicted noise level is an average monthly noise level of approximately 80dB_{L_{Aeq}}, which is predicted to occur for approximately one month and arises as a result of the breaking out of hard standing. There are approximately 20 flats in the south section of the building (APP208.01, para 21.7.5 to 21.7.6 and table 21.4).

Issues arising from the assessment

12.144 The number of properties which are predicted to have significant effects has reduced through the course of the examination as a result of additional mitigation measures proposed by the Applicant. However, the list above does not include three new blocks of flats that overlook the site at Kirtling Street (St James, Riverlight development containing over 400 flats). These were included as significantly affected until the 3rd March 2014 version of the draft Update Report when the impact was reassessed as not significant, even though night-time noise levels would be above the ABC threshold for 19 months. The reason given for two of the blocks was that *'this has been based on the assumption that occupants will keep windows closed. Unlike at other locations, this is considered a reasonable assumption during the night as well as*

the day and evening, as the developer has confirmed that mechanical ventilation and comfort cooling will be provided to all properties' (APP208.01, para 14.7.9). This is contrary to the statement made by the Applicant at the IS hearing¹⁸⁹ and reiterated in APP157, section 3.3), that the assessment is based on *'having windows open during the times of the year when people would naturally tend to have their windows open'*. We also note that many of these flats have balconies, so the potential loss of outside space appears not to have been considered.

12.145 We also requested that the Applicant undertake a noise assessment on a number of receptors that weren't included in detail in the ES for various reasons, eg Piper Building at Carnwath Road Riverside, new development at Chambers Street at Chambers Wharf and new development at Greenwich Pumping Station, all of which would be immediately adjacent to drive sites. These were presented in the Applicant's response (APP167) but none of them were included in the list of significantly-affected properties. This we found unconvincing as discussed below.

12.146 For example, the reassessment of the new development at Chambers Wharf on Chambers Street. The development is some nine or ten storeys high and will consist of affordable homes development with mixed rented and shared ownership. It is directly opposite the entrance to the site. The upper floors would not be shielded from noise by the site hoarding. The works site duration would be for six years with 33 months of 24/7 working. We are told that the new development includes 47 single aspect flats. The Applicant's assessment (APP167, section 7.1) gives no acknowledgment that the development is multiple floors high, and that higher floors would not have any sound mitigation from site boundary hoardings. The no significant effect assessment is made despite the Applicant's doubts whether mechanical ventilation is planned for the flats, and the acceptance that, with windows open, internal noise levels would be *'above the guidance for resting conditions but within the design range for reasonable speech or telephone communications (55dBL_{Aeq}) and reasonable conditions for study and work requiring concentration (50dBL_{Aeq})'*. We find the no significant effect assessment unconvincing when compared to the significant effect assessments for the other blocks of flats adjacent to the site.

12.147 Furthermore, the Applicant's assessment does not give any indication of the total number of households which would be affected as opposed to the number of blocks of flats. We asked for this information in Q29.3, and from the Applicant's answer we estimate that over 300 residential households (across all work sites) would be subject to a significant effect. If the assessment had been in accordance with the BS5228 Pure method, ie

¹⁸⁹ 4 February 2014

significance taken at the façade and no assumptions made with regard to windows open or closed, the number of residential households significantly affected would increase to approximately 1,800 (data from table 5.24, answer to Q29.5 in APP56). This information is only an estimate, as we note that the data had been sourced using Google Street view. We are aware from our site inspections that 89 -101 Carnwath Road, for example, is not one household but a housing association building occupied by multiple households.

12.148 Our accompanied site inspections included visits to a number of residential flats, including some that are not identified in the ES as having significant effects. For example, the flat visited in Pipers Building (Carnwath Road Riverside) would have a clear unimpeded aspect over hoardings into the main drive site. We could clearly hear the reversing lorries (which are temporarily using the proposed site) through the closed double glazing of the bedrooms. We requested that the Applicant re-assess the impact on these flats (many of which are single aspect) that would overlook a site operating 24/7 for 29 months. The Applicant provided a re-assessment which confirms that the upper floors would not be screened from activities by site hoardings but, even so, stated that the effects would remain as not significant (APP167).

12.149 We note that NPPG does consider that closing windows to eliminate adverse internal effects is possible, in which case alternative means of ventilation is likely to be necessary. However, there is no information provided by the Applicant as to which properties might require additional ventilation in order to maintain a healthy lifestyle. Nor is there information about the practicality of installing ventilation in such buildings. Provision of ventilation is included in the off-site mitigation measures (discussed later in this chapter), but there is no specific mechanism for a receptor to claim for ventilation if it is below the noise insulation trigger value.

12.150 The impact on the houseboats at Downings Roads Moorings was assessed by the Applicant as not significant but this was questioned in a representation from Nick Lacey¹⁹⁰ (REP194). The representation, which attached a report from Rupert Taylor, argued that the Applicant's '*assessment methodology is flawed in three important aspects, and that owing to their particular characteristics the residential barges at Downings Roads are likely to be exposed to unacceptable levels of noise for which there is no effective mean of mitigation*' (REP194, section 4). These three aspects referred to are:

- Ambient noise levels being measured remote from the moorings

¹⁹⁰ Nick Lacey: on behalf of Tower Bridge Yacht & Boat Company Ltd and the residential community at Tower Bridge Moorings at Downings Roads

- Levels of noise which they consider have been underestimated because, for certain operations during the installation of the cofferdam, there does not appear to be any practicable way of providing screening
- No account has been taken of the special characteristics of houseboats, which by their nature are more vulnerable to external noise than conventional dwellings, and which do not lend themselves to conventional mitigation measures.

12.151 We note that the Applicant has re-measured the baseline at the moorings as reported earlier; however this has not changed the assessment, which remains no significant impact. With regard to the other points above, we agree that the impact from water-borne noise has not been assessed as discussed earlier in this report, but consider that the requirement to use push piling (unless impossible) would reduce the impact of noise at the houseboats during the construction of the cofferdam. With regard to the special characteristics of houseboats, and effectiveness of conventional noise insulation, we discuss this later under the heading 'off-site mitigation'.

12.152 The above reasons are examples of why we are not confident that the impacts from noise have been adequately assessed. It is difficult to be assured from the data provided that the Applicant's conclusions have been arrived at on a consistent basis. We consider that the assessment of significant effects is unconvincing. In our view this is a particularly important matter because of the duration of the works and the extent of night-time working.

Vibration at residential receptors

12.153 The number of residential properties predicted to experience significant impacts from vibration has reduced substantially during the examination, as push piling has been specified at a number of foreshore sites unless 'impossible'. This removed predicted significant effects at blocks of flats at Albert Embankment Foreshore, Chambers Wharf and King Edward Memorial Park Foreshore.

12.154 However there are still two locations where vibration is predicted to cause significant effects¹⁹¹ as assessed in the ES Update Report. These are at:

- Shad Thames Pumping Station: two blocks of residential flats (also impacted by noise)
- Earl Pumping Station: two residential blocks (also impacted by noise).

12.155 The number of households affected by vibration at these two sites has not been provided, but from our review of the Applicant's

¹⁹¹ Significant effect criteria defined in Doc 6.2.02, table 9.5.2

answer to the ExA Q29.2, it would be over 50 households (APP56). The Updated ES Report notes that if low vibration piling were to be used, the impact could be reduced to not significant. However this has not been specified using the same 'unless impossible' terminology as the foreshore sites and therefore the significant effect prediction remains for these receptors.

12.156 If push piling is not possible at the foreshore sites set out above there would be significant vibration impacts on a number of properties. However, an alternative piling method, which we would expect to increase both noise and vibration levels, would need to be approved by the local authorities through CoPA¹⁹² s60¹⁹³ and s61¹⁹⁴. Overall, we consider that this matter has been adequately dealt with.

Cumulative effects of noise and vibration

12.157 At the IS hearing on 12 November 2013, Save Your Riverside, with regard to Chambers Wharf, commented that the cumulative effects of noise and vibration might be significant where the individual parameters were deemed to be not significant. The ExA asked the Applicant to indicate how the cumulative effects from noise and vibration would be considered (Q29.16).

12.158 The Applicant responded that there is no general requirement to consider combined noise and vibration effects from construction, but did note that short term temporary respite accommodation would be available through the application of TAPs¹⁹⁵ under the Non-statutory off-site mitigation and compensation policy (APP56, para 16.1.7 and 16.1.8). We discuss respite accommodation later in this chapter under the heading 'temporary rehousing'.

Noise at non-residential receptors

12.159 Significant effects on non-residential receptors, from construction works noise have been predicted by the Applicant. Details are included in the ES Update Report (APP208.01 with appendices). The list below indicates the properties that are predicted to have a significant effect from noise. There are no significant effects predicted from vibration.

- Albert Embankment (Camelford House)
- Victoria Embankment Foreshore (the Tattershall Castle and Hispaniola floating restaurants)
- Deptford Church Street (St Paul's Church and St Joseph's Roman Catholic Primary School)
- King Edward Memorial Park Foreshore (Pier Head Prep Montessori School).

¹⁹² CoPA: Control of Pollution Act 1974

¹⁹³ Requirement for control of noise at construction sites

¹⁹⁴ Prior consent for work on construction sites

¹⁹⁵ TAP: Trigger action plan for offsite noise mitigation. Provided for identified receptors

12.160 Mitigation proposals for non-residential receptors, particularly schools, were the subject of much debate at the hearings. We were concerned by the levels of noise increase above ambient at St Joseph's Roman Catholic Primary School of +11dB_{L_{Aeq}} at the external teaching areas and at Pier Head Prep Montessori School of +11dB_{L_{Aeq}} outside the classroom. Additional mitigation measures were proposed by the Applicant during the examination, which are noted. The commitment for these mitigation measures is through the TAPs which would be secured by a s106 agreement or obligation with the local authorities.

12.161 In addition to these mitigation measures, the Applicant has committed to mitigation measures to protect other non-residential sensitive receptors (through TAPs to be secured through s106 agreements and obligations) including:

- Falconbrook Pumping Station: York Gardens adventure playground, York Gardens Library and Community Centre
- Blackfriars Embankment Foreshore: City of London Boys School
- Chambers Wharf: Riverside Primary School
- Bekesbourne Street: Royal Foundation of St Katherine.

12.162 Our main concerns regarding the non-residential receptors have been mostly resolved through mitigation measures and TAPs, however we remain concerned about the impact on the external areas and general environment at St Joseph's Roman Catholic Primary School in Deptford. This is discussed further in chapter 13.

Noise from road and river transport

Road Traffic

12.163 There are no significant impacts predicted in the ES for either residential or non-residential receptors from road traffic¹⁹⁶.

12.164 As stated in LB Southwark's noise assessment on Chambers Wharf by Bureau Veritas (WRR075) should river transportation reduce by only 2% (to 88%) then the resulting increase in HGV movements would lead to an increase in noise level of 3.6dB on Chambers Street. This would result in a significant effect at the residential receptors on Chambers Street. The Applicant in its response to this assessment noted the comment and underlined its commitment to the use of barges. It did not challenge the increased noise level figure, but stated that should river transport *'not be possible for a period for any reason, the project would develop an alternative approach, consistent with compliance with noise criterion to the extent identified in the ES'* (APP31.02, table D.1). We do not have a similar analysis for the other sites which have assumed river transport, but we consider that the no significant impact noise

¹⁹⁶ Assessment assumes that 90% excavated material would be transported by river

assessment is very sensitive to changes in river transport and possible derogations.

12.165 However, as discussed in chapter 14, we rely on the control mechanism included in the River Transport Strategy (RTS)¹⁹⁷, to ensure that derogations can only be approved where necessary and reasonable and where approval would be unlikely to result in any new or materially different environmental effects from those assessed in the ES.

River transport

12.166 The Applicant's assessment predicts significant impacts from river transport at three properties:

- 89-101 Carnwath Road, which is adjacent to and upstream of the Carnwath Road Riverside site.
- 5 Carnwath Road, which is adjacent to and downstream of the Carnwath Road Riverside site.
- 8-14 Fountain Green Square, which is adjacent to and downstream of Chambers Wharf.

12.167 The Applicant is proposing, by seeking a separate planning permission, to reduce the impact on all three buildings by the installation of acrylic sheet hoardings on the river walls. These are outside the LLAU and are not secured by the DCO or s106 obligation. No evidence has been put before the examination that a planning application has been made or secured to deliver such measures. Accordingly, whilst we note the intention, we conclude that the acrylic sheet hoardings proposal should be given little weight.

12.168 The assessment in the ES and summarised in APP157 (Appendix E), is that there would be no significant impacts on houseboats due to river traffic. It states that the largest noise differential (at Nine Elms Pier) would be +2.7dB which is less than the 3dB threshold for significant effects.

12.169 We find this assessment unconvincing, for the following reasons:

- With regard to air-borne noise from river traffic at Nine Elms Pier, the assessment was carried out against a baseline noise survey on the shoreline (by the existing construction site) and not on the moorings. This does not appear to us to be a robust assessment because the baseline was not measured at the receptor and the assessment only needs -0.3dB change in ambient to result in a significant effect on the houseboats from river traffic in this location. The assessment that houseboats would not experience a significant effect while

¹⁹⁷ RTS: APP207.02

houses elsewhere have been assessed with a significant effect appears inconsistent.

- The air-borne assessment of impacts on the houseboats does not take into account the special characteristics of houseboats, which by their nature are more vulnerable to external noise than conventional dwellings (REP194, report by Rupert Taylor).
- As discussed earlier in this chapter (under the heading 'houseboats: methodology for assessment of river traffic impacts') we questioned whether the methodology had taken into account water-borne noise disturbance from tug boats manoeuvring barges in close proximity to the houseboats, particularly at night. This is particularly relevant at Nine Elms Pier where the houseboats are within 7m of the LLAU in the river.

12.170 We visited two houseboats at each of Nine Elms Pier and Downings Roads Moorings. As stated earlier in the section on methodology, both written and oral representations were made at the OF and IS hearings regarding the noise transfer through the hulls below deck.

12.171 As stated earlier in this chapter, the Applicant has agreed to undertake a survey of the houseboats, but the results are not before us. We are therefore unable to report with confidence on the effects on houseboats.

Open space: impacts from construction

12.172 The Applicant's open space assessment was undertaken in accordance with BS5228 method 2, which notes that an increase of 5dB or more above ambient for a month or more might be deemed to cause significant effects on open space.

12.173 As the ES did not include the analysis of the extent of the area impacted relative to the total available area, we asked for this additional information in Q11.19. The Applicant advised (APP11, section 19.2) that, of the 12 open spaces affected by noise, the proposed development results in the following impacts (ie percentage of open space above the +5dB threshold):

- 100% of St Paul's Churchyard Gardens at Deptford Church Street
- 20% of KEMP at King Edward Memorial Park Foreshore
- 20% of Victoria Embankment Gardens (William Tynedale) at Victoria Embankment
- 20% of Ranelagh Gardens at Chelsea Embankment
- 20% of Lee Valley Park at Abbey Mills
- 10% for 7 open spaces at King Georges Park, Barn Elms Sports centre, Barn Elms Playing Fields, Victoria Embankment (Charles Gordon), Inner and Middle Temple Garden at Blackfriars, Three Mills Green at Abbey Mills.

- 12.174 The Applicant assessed the impact on St Paul's Churchyard Gardens as significant, and the remaining 11 open spaces as not significant.
- 12.175 We have visited all the open spaces on unaccompanied and some on accompanied site inspections. We agree that the impact on St Paul's Churchyard Gardens would be significant.
- 12.176 However we are concerned that the Applicants answer on KEMP understates the impact. We note that the Applicant stated that 20% of the total open space in the park would have a noise level of plus 5dB above ambient (APP11, table 19.1). However, this was based on an ambient noise level of 61dB_{L_{Aeq}}, which was just one of the three ambient noise levels taken in the park. The other noise levels taken near the embankment were at 51dB and 54dB_{L_{Aeq}} (Doc 6.2.21, Appendix G, table G.10). A slightly lower ambient level was also confirmed by the baseline survey undertaken by LB Tower Hamlets/Free Trade Wharf which gave a baseline of 58.6dB_{L_{Aeq}} (in the bandstand) and 55dB_{L_{Aeq}} (1 Shadwell Cottages) near the school on weekdays (WRR040, appendix E). These noise level measurements are lower than the 61dB_{L_{Aeq}} used in the assessment, which would imply that the significant effect would be more widespread. From this, it would appear to us that the ES does understate the impact of noise on the park.
- 12.177 We note that the assessment of construction noise impact on open land has not been included in the ES Update Report.

Summary of assessment of significant effects

- 12.178 The proposed development would result in significant impacts on a large number of receptors over a prolonged construction period, including in some cases over three years of evening and night-time working. This would affect both residential receptors and non-residential receptors, including public open spaces and amenities.
- 12.179 We consider that the Applicant¹⁹⁸ is likely to have understated the number of receptors which would have a significant impact. In particular, the Applicant's own estimate of over 300 residential receptors which would have a significant effect would be as high as 1,800 if noise levels at the façade of the receptors were taken as the determining factor (see earlier).
- 12.180 However, we accept that the Applicant's assessment of internal noise levels should make no difference to eligibility for noise insulation (discussed later) because the noise insulation policy considers noise levels outside residential properties (1m from the façade).

¹⁹⁸ Using a modified BS5228 methodology to assess internal noise levels using professional judgement

12.181 We also consider that the method adopted does not take sufficient account of the external environment, which is an important factor when we consider the in-combination effects on amenity and quality of life. We are concerned for the health and well-being of local residents, particularly for those that live, attend school and work near sites with 24 hour working, and who would have no respite from the noise and disturbance. This is discussed further in chapter 13.

12.182 We have also come to the view that the impact on houseboats has not been considered fully. We note that a survey of the houseboats is ongoing, but the results are not before us and therefore we are unable to consider them.

12.183 With respect to the potential project-wide effects from ground-borne noise and vibration impact from tunnelling, we consider that the effects have been assessed adequately.

MITIGATION MEASURES

On-site mitigation

12.184 The NPS in paragraph 4.9.9 requires that the decision maker should not grant development consent unless it is satisfied that the proposals will '*avoid significant adverse impacts on health and quality of life from noise*' and '*mitigate and minimise adverse impacts on health and quality of life from noise.*'

12.185 The Panel considers that the starting point for this assessment is for us to assess whether the noise could be avoided completely; either by design or by the use of an alternative site. The rationale for the selection of sites or the purpose to which a site could be put (eg whether Chambers Wharf should be a reception site, not a drive site) is not considered in this chapter. We consider it in chapter 17. For the purposes of this chapter, we will consider only whether the application before us complies with the NPS in relation to noise and disturbance issues.

12.186 We note that during the course of the examination the Applicant did propose additional mitigation at most sites, which reduced predicted noise levels at some receptors and in places reduced an effect assessed as significant to one of no significant effect. Details of these mitigation measures are summarised in the Applicant's Summary of Additional Mitigation Measures and revisions to Compensation Policies (APP185).

Avoid significant adverse impacts

12.187 Further to the NPS statement regarding avoiding significant adverse impacts, the NPPG also has an aim to avoid noise levels above SOAEL.

12.188 The level of SOAEL was not specifically determined. However, it would appear from the Applicant's proposal for PW17 and table B1 in APP102.03 which gives the Applicant's approach to noise policy (referred to earlier in this chapter under the heading 'Applicant's approach to noise policy') that the Applicant decided that SOAEL (for noise) is the category C level in the ABC methodology. The draft Requirement PW17 was introduced in the 3 March 2014 version of the DCO, late in the examination and following the conclusion of the hearings. This did not change the Applicant's proposals for on-site mitigation measures, but is relevant to our report regarding off-site mitigation measures (see later section on off-site mitigation measures).

12.189 The Applicant proposed additional measures during the examination to avoid significant effects at some sites, for example:

- specification of push piling (eliminated vibration effects from piling and reduce noise levels)
- restrictions on types of activities allowed during night-time working hours at Barn Elms (removed the significant effect at night at Lancaster House)
- no night loading and moving of barges at Chambers Wharf (removed the night-time noise effect on Luna House and Fountain Green Square).

12.190 The Applicant also considers that the inclusion of a 'not environmentally worse than' (NEWT) clause in CoCP Part A (APP205.01, para 2.1.3) would avoid receptors that have been assessed as having no significant effect from becoming significantly affected (ie noise levels increasing to levels above SOAEL). The effectiveness of this clause is discussed below under the heading 'NEWT clause in CoCP Part A'.

12.191 With regards to vibration the Applicant stated in APP115.01, that the concept of SOAEL *'is new in policy terms. BS6472 Part 1 identifies levels of community response in terms of 'low probability of adverse comment' up to 'adverse comment probable', which is the point at which we say that this represents a significant observed adverse effect level.'* We take from this that the Applicant assumed that the SOAEL for vibration is $VDV\ 0.8ms^{-1.75}$ during the daytime and $VDV\ 0.4ms^{-1.75}$ at night for residential buildings¹⁹⁹.

12.192 The Applicant has provided no additional information on the assessment of the eight very sensitive non-residential receptors (referred to earlier in this chapter under the heading 'ground-borne noise - non-residential receptors'), so we have taken the

¹⁹⁹ BS6472-1:2008 Guide to evaluation of human exposure to vibration in buildings, table 1 gives $VDV\ 0.8ms^{-1.75}$ during the daytime and $VDV\ 0.4\ ms^{-1.75}$ at night for residential buildings as the lower level of the range where adverse comment is probable

worst case position provided by the Applicant, that there are eight very sensitive receptors which would be exposed to a significant adverse effect from ground-borne vibration. We have no information on how the impacts could be avoided or mitigated, or how the impact would relate to the SOAEL level. We consider that SOAEL may be relevant in these cases as some of the eight receptors did include places where there might be people staying long term.

- 12.193 We summarise our overall views on the NPS test²⁰⁰ for avoidance of significant adverse impacts in the conclusion to this chapter.

Mitigate and minimise adverse impacts

- 12.194 The NPPG suggests that consideration needs to be given to mitigate and reduce to a minimum where noise is between LOAEL and SOAEL.
- 12.195 LB Southwark states in its final written submission (REP491, key headlines page 2), that *'the application fails the test in paragraph 4.9.9 of the NPS for Wastewater because it sets SOAEL at too high a level, fails to avoid significant adverse impacts, and fails to set LOAEL, meaning that there is no assessment of the mitigation and minimisation of adverse effects between LOAEL and SOAEL and hence insufficient mitigation and minimisation delivered'*.
- 12.196 We agree that the application does not set out how it would specifically minimise and mitigate between SOAEL and LOAEL. However, the Applicant did repeatedly make a commitment to the use of best practice on site by the contractors. This was not specifically stated in the context of minimising between LOAEL and SOAEL, but we consider that it would have the same effect. We questioned the Applicant at the IS hearings on how best practice on site would be secured, and the following was added to CoCP Part A:
- 'Any significant effects from construction will be minimised in the vicinity of the works by implementation of this CoCP. The Contractor shall follow best practice at all times in minimising the construction impacts. Measures specified within this document are considered to be the minimum'* (APP205.01, para 1.1.9).
- This paragraph is not exclusively targeted at noise as it covers all impacts from all construction activities, but we are satisfied that the intent is clear.
- 12.197 We note that the use of s61 and local authority approval process (discussed later) would ensure that Best Practicable Means (BPM) are applied at each site, which would also serve to minimise and mitigate effects below the SOAEL level.

²⁰⁰ NPS, paragraph 4.9.9

12.198 We also note and have regard to the additional mitigation measures that were introduced during the examination at some of the sites. Examples are:

- specifying a minimum sound reduction of 20dBR_w, for cladding and roofing to enclosures
- night time activities within materials storage/handling area to be screened by a roofed, three-sided noise enclosure
- site offices and welfare buildings located to provide noise screening to the lower levels of Axis Court at Chambers Wharf
- higher boundary hoarding at some sites (eg Earl Pumping Station)
- river transport for delivery of tunnel segments to Chambers Wharf.

12.199 Some of the local authorities remain unsatisfied with the extent of the mitigation proposals including particularly LB Hammersmith and Fulham, LB Southwark and LB Tower Hamlets. For example, LB Southwark states in its final written representation (REP491, page 3), *'significant impacts would also arise at Shad Thames and Earl Pumping Station and the mitigation policies as drafted also do not provide required certainty that these impacts can be properly mitigated and minimised'*.

12.200 The Applicant has stated that no additional on-site mitigation measures are possible to reduce the significant effects further (ES Update Report, APP208.01 with appendices APP208.01.01 to 208.01.33). However, it also states in APP185 para 3.1.5, that *'we anticipate that further mitigation will be possible through the next stages of the project once Contractors have been procured and through progression of detailed design'*.

12.201 We note however that, as discussed previously, no information was provided with regard to the intermittent noise levels and character of the noise which might be intrusive for residents and affect their quality of life (day and night-time), even when the predicted dBL_{Aeq} levels fall below the SOAEL levels. Therefore receptors that might experience a large noise change, but have been designated as having no significant effect because the noise levels are predicted to be just under the level set in the ES (ie just under the ABC threshold), would have no protection from the off-site mitigation proposals discussed below. We discuss this further below under the heading 'control of noise from work sites'.

12.202 At King Edward Memorial Park Foreshore the local authority and other Interested Parties asked if a restriction on Saturday working could be included as a mitigation measure for respite from excessive noise on Saturdays. We asked about the impact of such a restriction for all sites in ExA Q25.8. In its response, the Applicant confirmed that it would increase the occupation of the sites by between 2 months and 3.7 months, but would not affect

the overall construction period. In its submissions, the Applicant stated that it would prefer not to restrict Saturday working. However, LB Tower Hamlets reiterated that it considers that *'the benefits of restricted weekend working will outweigh the disadvantage of a slightly longer construction contract. Therefore working hours should exclude all weekend working except unless agreed otherwise by the local authority in consultation with the community liaison/stakeholder group'* (REP447 section 4).

12.203 The Applicant has provided (on a without prejudice basis) suggested revised wording for restriction in Saturday working to be set out in the CoCP (APP115.03, paras 8.2.9 and 8.2.11). It has also requested that this should be applied only to the four sites close to amenities, ie Barn Elms, King George's Park, Deptford Church Street and King Edward Memorial Park Foreshore) and should allow maintenance work on Saturdays. We consider that the restriction on Saturday working should be applied in relation to the King Edward Memorial Park as explained in chapter 11 and in chapter 17; the means of securing this restriction is discussed further in chapter 20.

12.204 We summarise our overall views on the NPS test²⁰¹ to mitigate and minimise against adverse impacts in the conclusion to this chapter.

Control of noise on work sites

12.205 The NPS at paragraph 4.9.9 requires that the decision maker should not grant development consent unless it is satisfied that the proposals *'where possible, contribute to improvements to health and quality of life through the effective management and control of noise'*.

12.206 The NPS further states in paragraph 4.9.10 that *'when preparing the development consent order, the decision maker should consider whether requirements are needed which specify the mitigation measures or the measurable requirements put forward by the applicant to ensure that the noise levels from the project do not exceed those described in the assessment or any estimates on which the decision was based'*.

12.207 Our concern with regard to the lack of clarity of the intermittent noise levels that might be experienced over a prolonged period, both day and night-time, led us to investigate the control of noise from work sites in more detail. These were discussed particularly at the IS hearing on noise.

12.208 The CoCP Part A and the Non-statutory off-site mitigation and compensation policy establish the framework for the control of noise and vibration as a result of project works (APP205.01,

²⁰¹ NPS, paragraph 4.9.9

section 6). They are secured by Requirement PW6 (ie CoCP) and the legal obligations respectively.

12.209 In this section we report on methods of control of noise on site ie CoCP Part A, CoPA s60 and s61, the NEWT clause in CoCP Part A and the possible provision of noise limits requirements in the DCO.

Code of Construction Practice Part A

12.210 The CoCP Part A is intended by the Applicant to provide clear and appropriate means of monitoring and ensuring compliance with a wide range of good practice measures. It has been substantially amended during the examination in consultation with the local authorities. A joint Borough submission²⁰² in relation to CoCP Part A was submitted by LB Tower Hamlets in January 2014 (REP255). In its final written submission the Council recognises that changes have been made to address issues (REP492). However, at the end of the examination there were still some issues outstanding eg LB Hammersmith and Fulham and LB Southwark with regard to the NEWT provision and the absence of noise limits (REP490 and REP491).

12.211 Section 6 of CoCP Part A addresses noise and vibration and requires that the contractor prepares a Noise and Vibration Management Plan and obtains s61 consent from the local authority (APP205.01).

12.212 The Noise and Vibration Management Plan is required to include details of control measures to be included in s61 applications and details of noise and vibration monitoring arrangements, including location, reporting requirements and off-site mitigation to be brought forward (APP205.01, para 6.1.10). The monitoring proposals are to allow noise levels to be easily compared to forecast noise in the s61 consent and the ES (para 6.6.6). We note however, that this Plan does not address the pre-construction ambient noise level at sensitive receptors which we discuss later in this chapter under the heading 'off-site mitigation'.

12.213 With regard to our written questions on noise limits which are discussed further below, the Applicant has included two sections into the CoCP Part A:

- A requirement for the contractor to monitor, control and report instantaneous maximum (L_{Amax}) noise levels (para 6.6.7 to 6.6.12)
- The 'not environmentally worse than' (NEWT) clause which is discussed below.

²⁰² Joint Borough submission, on behalf of LB Tower Hamlets, LB Wandsworth, LB Southwark, City of Westminster, LB Hammersmith and Fulham, LB Richmond, LB Lewisham, and City of London

NEWT clause in CoCP Part A

12.214 In response to our concerns with regard to the control and minimisation of noise on site, the Applicant introduced the following 'not environmentally worse than' (NEWT) clauses into the CoCP Part A (APP205.01, para 2.1.2 and para 2.1.3):

- *'2.1.2: The contractor shall ensure that no significant adverse effects arise that are worse than those reported in the ES. This shall be achieved through the process described in paragraph 2.1.3.*
- *2.1.3: The contractor shall identify, before the relevant phase of construction, whether its detailed design, construction methodology, programme, site specific mitigation or other assumptions are materially different from those made during preparation of the ES. If they are, then the contractor shall carry out an assessment of the likely significant effects using the relevant assessment methodology for each topic as defined in the ES. That assessment will identify any mitigation that is necessary to ensure that no significant adverse effects arise that are worse than those reported in the ES.'*

12.215 We note the intent of the NEWT clause, but its effectiveness is based on the following points:

- The reliability of the levels assessed in the ES, and the accuracy and rigour of the process
- That these levels are acceptable.

12.216 In addition, the meaning of paragraph 2.1.2 caused some puzzlement as to how it would work in practice on three points:

- How it would minimise noise impacts between LOAEL and SOAEL?
- How it would avoid noise impacts above SOAEL? This is particularly important as it appears to protect a receptor that is predicted as having no significant effect from becoming significantly affected, but would give no protection to a receptor that was predicted as being significantly affected from a still higher level of impact
- Whether or not the actual noise levels predicted in the ES would be used as levels for the contractor to comply with?

12.217 We questioned the Applicant at the IS hearing (4 February 2014) on how the NEWT clause would work in practice and were advised by the Applicant that it is intended to prevent a receptor which currently is predicted to have no significant effects from becoming one with a significant effect. We were advised that the principle of the clause is not that the contractor would adhere to the noise level predictions in the ES, but with the assessments of significant effect. It was not clear to us how this would work in practice,

particularly as we consider that the ES assessment may have understated the significant effects.

- 12.218 The Applicant further explained NEWT and its application in the written summary to the IS hearing of 4 and 5 February (APP115.01, section 4). It confirmed that *'NEWT has been successfully applied on other projects and, as brought forward, provides the basis for ensuring that no receptor that is identified in the ES as being not significantly affected, could become significantly affected'* (APP115.01, para 4.1.19). However the example given was related to push piling and levels of vibration and did not clarify the local authority concerns about how the receptors that had been identified as having significant effects would be protected from having even worse significant effects.
- 12.219 We asked the Applicant how the NEWT principle would be adhered to for each parameter in the ES and how compliance would be monitored and enforced (the ExA's R53.1). In response the Applicant advised that compliance and monitoring would be enforced through the delivery of mitigation as subsequently defined in the contractors Construction Environmental Management Plan (CEMP) and would be enforced through Requirement PW6. The Applicant explained that the process would be completed before construction work commences on site. The CEMP would be subject to consultation and approvals as set out in section 2.3 of CoCP Part A. Approval of the CEMP would only be granted by the approving bodies if the contractor had demonstrated compliance with the NEWT principles (APP163).
- 12.220 However, as LB Southwark points out, the CEMP is a document that the local authorities would be consulted on, but they would not approve. Similarly, the contractor and the employer are required by CoCP Part A (para 6.6.1) to discuss the monitoring points with the local authorities, but they would not be approved by the local authority (REP491, section 4). We do note, however, that the contractor would have to adhere to any site-specific noise and vibration monitoring related conditions imposed by the local authority through s61.
- 12.221 Moreover, LB Hammersmith and Fulham in its final written submission (REP490), notes that *'the applicant's response to question 53.1 (APP163) does not adequately address ongoing monitoring arrangements, or identify any contingency should the effects of construction prove to have more significant effects than those identified at the time of the CEMP'*. The Council also commented that *'as currently proposed the NEWT commitment will only be breached if such breach is demonstrated from data for one whole month. This is likely to have impact on health and quality of life. NEWT should be a minimum commitment and not be subject to best practicable means, as that would subvert the environmental impact assessment regime'* (REP444, para 1.30).

- 12.222 LB Southwark has also queried in its final written submission '*just what numerical levels constitute NEWT is not clear for most locations from the ES, as updated. So NEWT offers insufficient certainty as to the levels that will be set and therefore that NEWT will achieve its aims in practice*' (REP491, section 4).
- 12.223 This illustrates the level of confusion that still remains. It is our understanding that the Applicant's intention is that there would be no numerical levels set, merely a commitment for any receptor that is not identified as significantly affected in the ES to remain not significantly affected in practice. As stated earlier, this relies on the assumption that the ES has correctly identified all significantly affected receptors. The assessment in the ES has been based in part on professional judgement, which would make it difficult for individuals to determine whether NEWT was being adhered to in practice. It is not clear to us how this commitment would be managed and ensured throughout the contract.
- 12.224 While we can understand that the NEWT clause has been added with the Applicant's best intentions, we do not consider that it would have full effect and would not give protection to receptors from impulsive noise levels. The other aspect that we find unsatisfactory is that there is no means by which a receptor that has been assessed as having a significant affect is protected from a material increase by the NEWT clause.
- 12.225 We therefore do not consider that the NEWT clause as currently drafted in the CoCP meets the NPS requirements to minimise and mitigate adverse impacts. Although we do accept that it would avoid a receptor becoming significantly affected if it had not already been deemed to be so by the ES.
- 12.226 Accordingly we consider that weight can only be attached to the commitment secured that '*no receptor that is identified in the ES as being not significantly affected, could become significantly affected*' and little weight attached with regard to the specific control and limitation of impacts, and our wider assessment of impacts.
- 12.227 In the event that the Secretaries of State should decide that the NEWT clause requires amendment to ensure that it fulfils the intent to constrain the contractor to the levels assessed in the ES, then a project-wide requirement would be required in the DCO. However such a requirement has not been drafted or consulted on.

Control of Pollution Act (CoPA) s60 and s61

- 12.228 The Applicant states that the CoPA section 61 consent applications would be used to provide further detail on the noise predictions for the works, along with the precise mitigation that would be implemented (APP205.1, section 6).

12.229 At the IS hearing on 20 February 2014 the local authorities commented that s61 secures BPM²⁰³, but this is subject to the contractor's costs being taken into account. Therefore a mitigation measure promised now might not be forthcoming in future if circumstances change to increase costs. Both LB Tower Hamlets and LB Southwark stated that they would prefer noise limits to be set in the DCO. This was further confirmed by LB Hammersmith and Fulham and LB Southwark in their final written submissions (REP490 and REP491).

12.230 In addition LB Southwark comments in its written representation on 3 March 2014, that *'section 61 cannot be relied upon as sufficient evidence of mitigation to enable consenting of the works that will produce noise impacts to be mitigated. There are too many variables in the mitigation that might come out of the section 61 process. Without certainty at the point of consent, section 61 alone does not offer an appropriate method of control. With the works consented under the DCO, section 61 and the best practicable means test imposes only an obligation to do one's best to control noise while still delivering the works'*. The Council goes on to state that *'it is quite possible that the section 61 process will not deliver adequate mitigation and so the works should not have been consented in the first place'* (REP449, section 6).

12.231 LB Southwark further confirms its view that *'Noise limits in DCO requirements are therefore required not to duplicate the s61 regime, but to complement it and create the necessary certainty for the project to be consented'* (REP449, section 6).

12.232 We have examined the case for noise limits and report on it below.

Noise limits

12.233 As stated earlier in this report, we remain concerned that the Applicant has not provided information on any 'distinctive tonal, impulsive or low frequency characteristics of noise' as required by NPS paragraph 4.9.4. We are also concerned that, as the ES presented noise levels as a range with a typical monthly construction noise level, there could be higher impacts than forecast on a daily or nightly basis.

12.234 We identified early in the examination that there might be a need for noise limits to be included in the DCO as a requirement for each surface construction site, and asked in Q29.11 *'if the Secretaries of State were to decide that there should be a maximum noise level imposed at each site, what would be the practicable noise levels that could be set for each site during the specified working hours, expressed as $dB_{L_{Aeq}(1-hour)}$ for day and evening and expressed as $dB_{L_{Aeq}(5-minutes)}$ for night-time? Justify the levels suggested.'*

²⁰³ BPM: best practicable means as defined under section 72 of CoPA

12.235 The Applicant declined to provide the noise levels requested (APP56, section 11), reasoning that:

- it would not be *'practicable to set out unchangeable maximum noise levels at each site, expressed as dBL_{Aeq}(1-hour)'*
- there is no precedent for limiting daytime construction noise for this type of project in terms of dBL_{Aeq}(1-hour)
- at the early stage in the project's planning, the uncertainty would be such that *'any maximum level set would be too high to provide meaningful protection to local residents and other noise sensitive facilities'*.

12.236 Although the reasoning in the second bullet set out above was constrained to there being no precedent for limiting daytime construction noise, the Applicant also declined night-time noise limits.

12.237 The Applicant goes on to explain the five steps of its noise strategy:

- committed mitigation at this early stage
- commitment for the contractor to investigate and then employ all further mitigation that is practicable
- CoPA s61 consent process (including possible noise limits)
- off-site mitigation triggered when BPM on-site is exhausted and there would remain significant impacts on people inside their homes, community facilities or places of work
- monitoring to ensure compliance.

12.238 The Applicant further suggests that if the ExA were minded to set noise limits of any form, then to be practicable any level set now should be subject to modification by the s61 consent process, as was adopted for the permission to build the Olympic Park (APP56, section 11).

12.239 In acknowledgment of the matters that we raised in relation to high noise levels that could occur over short periods of time, the Applicant did amend the CoCP Part A to require the contractor to identify as part of its s61 consent application, those construction activities that could give rise to significant impulsive noise events and the mitigation, or management processes in accordance with best practicable means, to minimise these impulsive noise events.

12.240 The subject of noise limits was also raised by a number of Interested Parties. St James Group Ltd, in its written representation suggested maximum noise levels at Kirtling Street and Heathwall Pumping Station sites (WRR087, appendix 9). In this regard the Applicant similarly declined to agree to maximum noise levels and noted in its response to the ExA's Q29.10, that *'the Riverlight development was designed to provide a high degree of sound insulation to combat high existing noise levels. This*

protection will also mitigate construction noise.' (APP56, para 10.1.4). The response goes on to mention trigger values for temporary rehousing at these apartments; however we note that in the ES Update Report they are now considered not to have a significant effect.

12.241 At the IS hearing on 4 and 5 February 2014, LB Hammersmith and Fulham, LB Southwark, LB Tower Hamlets and St James Group Ltd all confirmed that they would prefer noise limits included in the DCO.

12.242 The day before the resumed IS hearing on 20 February 2014, the Applicant submitted a paper for consideration on noise limits, based on an example at Chambers Wharf. The Applicant's suggestion (APP150, dated 19 February 2014), was for typical monthly noise level limits ($\text{dBL}_{\text{Aeq,T}}$) set by the ABC methodology, except where exceedances have been estimated in the ES. Daily maxima at +5dB would be allowed above these limits and also increased thresholds for short term works (eg site set-up, demolition, cofferdam construction and fill).

12.243 The proposal also included a maximum noise level at night of $85\text{dBL}_{\text{AFmax}}$ as determined at the façade of any dwelling with no more than 20 exceedances allowable between 2300hrs and 0700hrs. The $85\text{dBL}_{\text{AFmax}}$ (with up to 20 exceedances) was explained by the Applicant at the IS hearing to be possible within the typical monthly night noise levels. This maximum night noise level was withdrawn as a parameter at the IS hearing and not included in the final drafting, but the draft and subsequent discussion highlighted the vulnerability of the proposal and confirmed our concerns about intermittent noise levels and potential impacts from the permitted exceedances.

12.244 The Applicant's suggestion was in draft form in APP150. Notwithstanding this, the local authorities did respond with comments in their written submissions on 3 March 2014.

12.245 The most detailed comments on the Applicant's noise limitations paper (APP150) were from LB Southwark. The Council commented negatively on the suggestions and the lateness of the draft proposal in the process (REP449, section 7). It summarised that *'the council supports the imposition of noise requirements consistent with the Requirement MS9 in the Hinkley Point Development Consent Order, consisting of:*

- *Noise limits imposed across day, evening and night, with a L_{Amax} at night*
- *Provision for council approval of monitoring scheme, any short term increase in noise up to 75dB L_{Aeq} , 1 hour only and any other exceptions*
- *45dB at night*
- *Limits measured at the façade of any dwelling.'*

12.246 The Applicant responded that it does *'not consider the example of Hinkley Point C to validate noise limits to be justified in this context as Hinkley Point is not an urban environment'* (APP198.24, para 1.11.5). We find the logic of this response unsatisfactory as we would have thought it might be considered to be even more important to have noise limitations in an urban residential environment than it is in a non-urban environment as was the case at Hinkley Point C.

12.247 St James Group Ltd, in its final written submission (REP457, dated 3 March 2014), maintains the view that the best way of controlling noise to an acceptable level at Riverlight would be by means of maximum noise levels in dBL_{Aeq} format with $\text{dBL}_{\text{AFmax}}$ figures for night-time noise (REP457, para 3.1 to 3.3). The St James Group Ltd final submission also appends suggested wording for a DCO requirement on maximum noise levels and noise monitoring for Work Nos 13a and 13b (ie Kirtling Street). The suggested noise levels for day, evening and night-time, are limits of:

- day: $75\text{dBL}_{\text{Aeq},12 \text{ hours}}$
- evening: $75\text{dBL}_{\text{Aeq},1\text{hr}}$
- night: $70\text{dBL}_{\text{Aeq},1\text{hr}}$ and $83\text{dBL}_{\text{AFmax}}$.

12.248 The Applicant has responded to St James Group Ltd proposals but does not agree to them (APP198.36). The Applicant goes on to state that the limits and requirements sought would not be practicable or would duplicate requirements in the CoCP (eg monitoring) and are therefore unnecessary. We have also reviewed the proposals, but note that the noise limits suggested would be in relation to the Riverlight development only, and have not taken into account the potential impacts on other receptors (eg the houseboats at Nine Elms Pier).

12.249 The Applicant's alternative suggestion for *'hypothetical project wide requirements in respect of noise and vibration limits'* was developed further for all sites and submitted as the Noise Limits Paper (APP188) on 3 March 2014. In it the Applicant states that the noise strategy, both on-site and off-site, is robust and appropriate for the project and expresses concerns about imposing noise limitations. The Secretaries of State are asked by the Applicant in considering this matter to take account of:

- *'the critical importance of ensuring timely delivery of the project*
- *the fact that the Environmental Statement fulfils its designated function by assessing the likely significant effects of the project, which is a different function from defining absolute limits to be imposed at all times'* (APP188, para 1.1.4).

- 12.250 The Applicant goes on to state that the options '*should be considered hypothetical and therefore caution is necessary before imposing limits of this nature*'.
- 12.251 Our view on the Applicant's concerns is that, on the first point, we are not convinced that imposing noise limits would substantially affect the programme of works. We were given no evidence to support this assertion. We are also not convinced that it would be appropriate to put the health and well-being of local residents at risk because of expediency. On the second point, we and other Parties requested noise limits that could be set at $\text{dBL}_{\text{Aeq},1\text{hr}}$ levels and either $\text{dBL}_{\text{Aeq},5\text{mins}}$ or dBL_{Amax} at night (WRR087 and ExA's Q29.11) and not set at the monthly average levels predicted in the ES.
- 12.252 We also note that at the IS hearing (20 February 2014), LB Tower Hamlets stated that the Crossrail project has maximum noise limits imposed at Canary Wharf. In response, the Applicant commented that these had been imposed under the s61 consent process. However, we have no evidence before us of the levels imposed at Canary Wharf, the context in which they were imposed, or the implications of such limits on the tunnel progress and delivery.
- 12.253 LB Southwark did not withdraw its earlier concerns in response to the Applicant's final proposals. Instead, it suggested an alternative form of drafting for a requirement based on noise limits for residential and non-residential receptors across day, evening and night with a dBL_{Amax} at night. The noise limits would be set at SOAEL using method 1 and if appropriate method 2 (and applying the lower of the levels produced), with a $60\text{dBL}_{\text{Amax}}$ at night (with a maximum of 2 events over that limit per hour). Noise limits would be measured at the façade of any dwelling unless agreed otherwise with the local authority. The noise limits detailed would apply except for specific daytime, short duration construction or demolition activities during site set up, demolition and cofferdam construction and fill phases (see REP491, section 5 for details). This suggested requirement was published on 11 March 2014, at the end of the examination. Accordingly, the Applicant did not have the opportunity to respond before the examination closed.
- 12.254 LB Hammersmith and Fulham confirmed that it supports the inclusion of a requirement that would limit noise levels to a specified level, and that noise levels should be below the SOAEL and should meet the WHO Guidelines to reduce adverse health and well-being effects.
- 12.255 LB Hammersmith and Fulham also confirmed that the Council continues to support the imposition of noise requirements similar to the requirement in the Hinkley Point C DCO with limits set at the façade of any dwelling or sensitive receptor. With regard to the Applicant's Noise Limits Paper, it considers that '*there is no*

justification for setting noise limits and then allowing an increase on those noise limits of +5dB' (REP490, para 9.3). It disagrees with the evening and night-time measurement of 1 hour and considers that it should be reduced to 5 minutes. The Council also considers that definitions are needed for monthly and daily limits in order that there would be clarity in the implementation of the requirement. Finally the Council states 'it is of concern that at this late stage in the examination important documents such as this and the DCO are still in draft and local authorities and other Interested Parties will not have the opportunity to comment on the final documents' (REP490, para 10.1).

12.256 The Panel's view of the Applicant's suggested noise limits (in APP188) is that they would not meet the requirements of the NPS to minimise noise on site. Moreover, they may even encourage the contractor to work up to the limit and undermine the ES predictions and householders' expectations of what they might experience from the ES predictions. For example, at Wapping High Street (residential flats across the river from Chambers Wharf) the ES has predicted a night noise level range of 26-40dB_{L_{Aeq}} with a typical monthly construction noise level of 40dB_{L_{Aeq}} (APP208.01, table 20.4). This has been assessed as no significant effect and the receptors would not be eligible for noise insulation. A householder reading the ES would expect a monthly night-time noise level of about 40dB_{L_{Aeq}}. However, the Applicant's noise limit proposals would set a typical night noise limit of 56dB_{L_{Aeq,T}} for the same receptor over the same period. In addition a +5dB would be allowable on a daily basis as long as the monthly figure was retained within the typical monthly noise limit. A contractor might reasonably assume that these were limits that could be worked to; which in turn could undermine the predication in the ES.

12.257 We note however, that the Applicant's suggested noise limits in APP188 would assist minimisation and mitigation at the properties that have been predicted to have noise levels above the ABC thresholds. This is because the suggested threshold level is set at the predicted noise level, and would therefore give some security that the noise levels would be constrained to at least the average monthly levels, with the potential for a +5dB daily increase and the temporary relaxation limits.

12.258 We have reviewed the context and evidence before us in relation to noise limits and we consider that there is uncertainty in relation to:

- the practicality of setting maximum noise levels at each site, expressed as dB_{L_{Aeq}(1-hour)} for day or dB_{L_{Aeq}(5-min)} for night-time
- whether any maximum level that could be set would be too high to provide meaningful protection to local residents and other noise sensitive receptors

- whether any particular noise levels due to specified works and activities are an inevitable consequence of the development.

12.259 Whilst we have considered all the noise limits suggested by the Parties, we do not consider that an appropriate noise limit requirement is before us. This is because we do not consider that the hypothetical requirement put before us by the Applicant is a suitable mechanism to constrain noise levels as it does not address the impulsive or maximum noise levels, which is one of our concerns. Moreover, no evidence has been put before us from other Parties for suitable levels of $dB_{L_{Aeq}(1-hour)}$ for day or $dB_{L_{Aeq}(5-min)}$ for night-time, which we can be confident would be practicable for the work sites.

Vibration limits requirement

12.260 The Applicant also presented a similar hypothetical project-wide requirement for vibration limits set at the level of significant assessment (APP188). For similar reasons to those given above we do not consider that these requirements would meet the need to minimise the effects on receptors, and could indeed act contrary to the intention in practice.

12.261 LB Southwark requested a maximum vibration level requirement, where levels should equal SOAEL ie. 1mm/s SOAEL by day; 0.3mm/s SOAEL by night, all as PPV (REP491). Again this suggested requirement was submitted for the 11 March 2014 deadline, at the end of the examination, so the Applicant did not have the opportunity to respond before the examination closed.

12.262 We do not consider that there is a need for a vibration limit requirement, because push piling has been specified (unless impossible) at most sites, and any change in methodology would require approval by the local authorities under s61. Moreover, the Non-statutory off-site mitigation and compensation policy provides for respite accommodation if vibration levels are in excess of the trigger values for more than one day, as measured in VDV. We agree with the use of VDV for this measure because it is the methodology specified in BS6472 for the assessment of human response to building vibration (see earlier in this chapter under the heading 'avoid significant adverse impacts').

Summary on control of noise on work sites

12.263 In the NPS paragraph 4.9.10, we are advised that when preparing the DCO, the decision maker should consider whether requirements are needed to specify the mitigation measures or the measurable requirements put forward by the Applicant to ensure that the noise levels from the project do not exceed those described in the assessment. In paragraph 4.9.11, the decision maker should consider whether mitigation measures are

acceptable and may impose requirements to ensure delivery of these mitigation measures.

- 12.264 The Applicant has assessed noise impacts from the work sites as average monthly noise levels. These have been reviewed and we consider that adequate mitigation measures would be secured through CoCP Parts A and B and through the CoPA s61 process. This is carried forward to our assessment of the NPS tests.
- 12.265 However, as stated earlier we do not have any information on predicted intermittent noise levels.
- 12.266 In view of the large number of sensitive receptors, the long duration of the works and the extent of night-time working, we would have preferred to be able to report on intermittent noise levels and recommend a noise limit requirement as mitigation. Our preference would have been for this to include site-specific requirements for noise limits expressed as $dB_{L_{Aeq}(1\text{-hour})}$ in day and evening and expressed as $dB_{L_{Aeq}(5\text{-minutes})}$ at night, with temporary relaxations (eg during site set up and cofferdam construction).
- 12.267 Whilst the Applicant initially declined to provide appropriate limits for such a requirement (in response to Q29.11), these were subsequently provided but expressed as monthly noise limits (APP188). We did not find them satisfactory for the reasons set out above.
- 12.268 St James Group Ltd did suggest noise limits for Kirtling Street and Heathwall Pumping Station, but the Applicant stated that they would not be practicable. Also, whilst LB Southwark put forward noise limits at the end of the examination, these were not received in sufficient time for the Applicant or others to comment. Accordingly, we are not in a position to recommend a noise limit requirement.
- 12.269 We accept that such a requirement might be able to be imposed at the s61 CoPA consent stage by the local authorities, but whether this would be so is uncertain. We therefore cannot report with certainty on the levels of disruption from noise that persons living and working near the sites would be subjected to. This matter is also carried forward for the overall assessment of the NPS tests later in this chapter.

Off-site noise mitigation

- 12.270 The NPS in paragraph 4.9.13 states that where all other forms of noise mitigation have been exhausted, the Applicant may consider it appropriate to provide noise mitigation through improved sound insulation to dwellings, or in extreme cases, through compulsory purchase of affected properties.
- 12.271 The Applicant has produced a policy for noise insulation and temporary rehousing titled Non-statutory off-site mitigation and

compensation policy (APP210.01). It has been included as appendix 3 to the legal obligations securing off-site mitigation and compensation policies relating to the Thames Tideway Tunnel and the Resources for the Councils (APP209.03). However, there remain aspects of the policy which are still outstanding and are of concern to us, the local authorities and a number of the representative community groups and other Interested Parties.

12.272 In this section we report firstly on noise mitigation through insulation and then on the provisions for temporary rehousing.

Noise insulation

12.273 The Applicant has committed to provide noise insulation above certain trigger levels. The Applicant states that the Category C noise threshold for night-time used for the ABC methodology may be considered to be SOAEL (APP11.01.01, para 3.1.10). It also states that the 75dBL_{Aeq,12hr} daytime noise level used as part of the ABC criteria can be taken to be a SOAEL before going on to explain that *'Above these SOAELs, noise levels inside properties would lead to significant adverse effects. This is why Thames Tideway Tunnel will provide noise insulation to properties where it is not reasonably practicable to further reduce noise exposure outside the properties due to Thames Tideway Tunnel construction'* (para 3.1.10 to 3.1.13).

12.274 The Non-statutory off-site mitigation and compensation policy (APP210.01) covers dust, light, noise insulation, vibration and temporary rehousing. Trigger levels are included for noise insulation and temporary rehousing, with lower levels set for special cases such as shift workers and vulnerable people. Houseboats are considered as special cases for the assessment of compensation claims resulting from noise. However, there are no details of trigger levels for air, dust or ventilation. There is no mention on whether someone could claim for assistance with ventilation if a property which has been deemed to have no significant effect in the ES, would have to keep windows closed to reduce impacts inside the home.

12.275 Trigger levels for noise insulation in the policy comply with the levels set in BS5228-1 table E.2 and have been based on predicted noise levels at 1m from the façade of the building. As such the eligibility for noise insulation would be irrespective of the use of the Applicant's professional judgement in the determination of significant impacts made in the ES.

12.276 In response to concerns about the certainty of noise insulation for properties which have been predicted to have a 'significant effect', the Applicant has proposed Trigger Action Plans (TAPs) which would address the concerns of the affected properties before construction work started on site. This commitment was welcomed by both the local authorities and other Interested Parties. The list

of receptors which are eligible for a TAP, with plans of the affected façades, is included in appendix 1 of the Legal Agreement²⁰⁴ (APP209.03). In addition to the list of properties given in appendix 1, the Applicant has committed to TAPs for the houseboats at Putney Pier and Nine Elms Pier (APP201.01, appendix C, para 1.1.3).

12.277 We note that the list of properties for TAPs includes some properties which are forecast to have significant effects in the ES Update Report but which were not identified as being eligible for noise insulation, eg Lancaster House at Barn Elms and Axis Court at Chambers Wharf. These, generally, are properties where, after the additional mitigation has been applied, the noise levels should fall outside the Policy. Notwithstanding this, the Applicant has made the commitment for noise insulation on a precautionary basis and to recognise the potential for in-combination effects. This is noted by the Panel.

12.278 A sample TAP was worked up, by the Applicant, for Luna House at Chambers Wharf, which is forecast to experience high noise levels in daytime. The pilot TAP was developed for a single unit in the block of flats which we visited during our accompanied site inspection. However Save Your Riverside (SYR) raised further concerns about the draft TAP and the thermal impact of the secondary glazing on rooms that already have full height and width windows and where occupants would be unable to open windows (appendix to REP496). Moreover the proposed alternative ventilation would require piercing the windows which would subsequently have to be replaced. Such work would require physical intervention in the fabric of the building and the consent of the freeholder. The SYR representation goes on to say that, *although every effort had been made 'to try to propose a plan of mitigation, thus far the current draft TAP remains speculative, and the impact unsatisfactory. Engineering solutions, even completed ones, achieved henceforth at notable cost to the project, may well not be effective and they will never cover the holistic human impact of the noise and other impacts of the proposed works at Chambers Wharf as a main drive site'*. We note SYR's comments but also note that, whilst it may be an imposition, there is no evidence provided that noise insulation would not be effective. We also note that if noise insulation cannot reasonably be installed, then residents would be eligible for temporary rehousing (see below).

12.279 Another property that would have significant effects over a long period is Free Trade Wharf (South) at King Edward Memorial Park Foreshore, which is predicted to exceed the ABC criterion for 24 months (APP208.01, para 21.7.5). The peak average monthly noise level at this receptor would be 80dBL_{Aeq}. The property is

²⁰⁴ Secured by legal agreement or unilateral undertaking

included in the list for a TAP, but there are no sample details before us in relation to this property.

- 12.280 We were concerned about what would happen to residents of houses where noise insulation is not feasible either due to the design of the property or perhaps because it is listed and the level of intervention required would be inappropriate. The Applicant, in response to our Q29.14, included a clause in the policy (APP210.01, para 5.1.10) stating that *'where, due to the nature or type of building, noise insulation cannot reasonably be installed, affected owners or occupiers shall qualify under the temporary rehousing section of the Policy'*. This commitment is noted.

Noise and vibration trigger values – Requirement PW17

- 12.281 On 19 February 2014 (the day before the reconvened noise IS hearing) the Applicant submitted a paper titled Off-site Mitigation Discussion Paper which included a hypothetical example of an approach to noise mitigation, based on a wider interpretation of policy, and with trigger levels for noise insulation of ambient +5dB (with lower cut off level of 65, 55, 45 dBL_{Aeq,T} during day, evening and night as defined by BS5228-1 example method 2) (APP152, para 3.3.4).
- 12.282 However, the subsequent submission from the Applicant, Offsite Mitigation Paper (APP187, 3 March 2014) argues that an extension to the off-site mitigation would be inappropriate and inconsistent with the NPS and NPPG (APP187, section 3.2). It notes that a lower threshold would increase noise insulation from approximately 300 to 3,000 windows at an additional cost of between £25m and £50m.
- 12.283 In the 3 March 2014 version of the DCO the Applicant added a new draft Requirement PW17 regarding noise and vibration trigger values. The Applicant advised that the addition of Requirement PW17 to the DCO was so that *'the values that will trigger noise insulation or equivalent mitigation are clear on the face of the DCO, and further the inclusion of this requirement would enable the Secretary of State to amend those values without needing to amend the non-statutory off-site mitigation and compensation policy'*. Whilst we understand the Applicant's intentions on this matter, we do not consider that the ExA has a sufficient evidence base to recommend any alternative values.
- 12.284 The draft Requirement PW17 is similar to the terms included in the Non-statutory off-site mitigation and compensation policy; however there are new parameters added. Therefore there are inconsistencies between the DCO and the Policy. The key differences (for noise insulation) are:
- A new clause (PW17, para 2.3.3) which gives an alternative option for the trigger values shown in table 1 to apply *'where*

a significant effect is identified using the assessment methodology defined in the Environmental Statement and forecast noise level exceeds assessment category C defined in the Environmental Statement even if the duration trigger values in paragraphs [requirements²⁰⁵] 2.3.1 and 2.3.2 are not exceeded' and noise insulation does not already exist or a grant has not already been paid. This is not included in the Policy.

- In PW17 (para 4.2.1) vulnerable persons would have a reduction on air-borne and ground borne noise trigger levels of 5dB (PW17 para 4.2). This is less than the 10dB figure in paragraph 7.2.4 of the Policy.

12.285 The draft Requirement PW17, paragraph 2.3.3, is also a change from the hypothetical options given in APP152 on 19 February 2014, as category C is set at 75, 65, 55 dBL_{Aeq,T} (day, evening, night) whereas the method 2 in APP152 was at ambient +5dB with lower cut off of 65, 55, 45dBL_{Aeq,T}. No explanation of the change was given by the Applicant.

12.286 LB Southwark comments on the draft Requirement PW17 and the lack of explanation for the new paragraph 2.3.3. It suggests that in the absence of any explanation, the ExA should assume that it is intended to catch the properties specified in the Non-statutory off-site mitigation and compensation policy for pre-triggered TAPs. (REP491, section 10a).

12.287 Our observation on the draft Requirement PW17 clause 2.3.3, is that it would also be applicable to properties that had not been assessed in the ES (for example because they had not been built), and therefore we consider that it is a helpful addition to the criteria included in the Policy.

12.288 There are other inconsistencies between PW17 and the Policy; these are discussed further in this chapter under the heading 'temporary rehousing'.

12.289 The possible addition of Requirement PW17 and the treatment of the inconsistencies are discussed further in chapter 20.

Baseline issue

12.290 With the inclusion of TAPs into the noise insulation policy it became less clear how a property, that is not predicted in the ES to be significantly affected, could apply for noise insulation if they subsequently experienced a significant effect. Some local authorities were concerned about this aspect and about the lack of certainty regarding mitigation measures, noise limits, the duration of the noise impact on receptors and potential impacts on health and wellbeing. For example LB Tower Hamlets in its final written

²⁰⁵ Our recommended drafting in appendix F removes the unnecessary reference to requirements

submission noted that *'the ambient noise level will be an important factor in determining eligibility for noise insulation or temporary rehousing and thus must be as accurate as possible. Furthermore, the ambient noise level should be determined at a residential façade (BS5228) and it is understood that little of Thames Waters baseline monitoring has actually been undertaken at residential façades and in any case, the selected locations were not agreed with the local authority'* (REP492).

12.291 This leads on to the importance of the baseline measurement location. The Applicant confirmed at the IS hearing on 20 February 2014 that the baseline would be remeasured before construction starts on site, but that the same locations would be used for the measurements. This does not address the issues raised by the local authorities that the baseline should accurately reflect the noise levels at the actual façade of the affected property. LB Tower Hamlets in its final written submission confirmed that this is still an outstanding matter (REP492). From our own examination of the representations and undertaking site inspections we have noted a number of locations where the measurement point may not have represented the receptors' actual noise levels (eg ground level or on another façade of the building).

12.292 This issue was illustrated by the baseline measurements taken at Elm Quay Court²⁰⁶ in February 2014. If the ES baseline states that ambient is less than the noise insulation trigger level values, there is no issue because the trigger values apply without modification. However, the noise insulation trigger level values²⁰⁷ do not apply where the ES ambient level²⁰⁸ is greater than the noise insulation trigger value²⁰⁹. In these instances (in both PW17 and the Non-statutory off-site mitigation and compensation policy):

- the trigger level for noise insulation is ambient as reported in the ES
- the trigger level for temporary rehousing is ambient as reported in the ES plus 10dB.

12.293 A potential problem arises for properties where the baseline (in the ES) states that the ambient is higher than the noise insulation trigger value, but in reality the actual ambient at the façade of the relevant property is lower than the trigger level (as has been shown for Elm Quay Court). This would mean that the property would not be eligible for noise insulation or temporary rehousing until a higher level of noise had been reached than would have been the case if the actual ambient had been known.

²⁰⁶ Measurement of ambient at Elm Quay Court showed a 50dB_LAeq night-time ambient, as opposed to the 62dB_LAeq ambient used in the ES

²⁰⁷ PW17, table 1 and Non-statutory off-site mitigation and compensation policy, table 4.1

²⁰⁸ In the absence of construction noise

²⁰⁹ PW17, paragraph 2.2 and Non-statutory off-site mitigation and compensation policy, paragraph 4.2.2

- 12.294 We have reviewed the data provided by the Applicant²¹⁰ and established that there are a number of work sites where the ES ambient is reported as above the noise insulation trigger values (for example the receptors across the river opposite Kirtling Street). We accept that for some locations the ES ambient readings would be representative (eg Axis Court); however as shown on the two remeasurements we have before us (Elm Quay Court and Downings Roads Moorings), the ES ambient can be unrepresentative of the actual ambient at receptor façade.
- 12.295 We consider that it would be necessary to check the accuracy of the ambient noise measured at the façades for those properties assessed in the ES to have ambient levels which are higher than the trigger level values. This would be in addition to the ES monitoring points and the CoCP Part A noise monitoring requirements. This would ensure that the baseline measurement would be representative of the façade and that the off-site mitigation proposals would be an effective mitigation measure for properties that experience noise levels above SOAEL.
- 12.296 Although we questioned the Applicant about the baseline, the full extent of the issue and the implications on qualification for noise insulation only became apparent to us in the later stages of the examination. Consequently, although the matters were discussed widely and all Parties given an opportunity to make representations on baseline we do not have a suggested requirement from the Parties before us. However, from the representations we received, we consider that the issue could be relatively easily overcome by additional measurements of the pre-construction baseline ambient at points to be agreed with the local authorities before construction starts on site. The qualification for noise insulation could then be reassessed using these measurements. This is discussed further in chapter 20.

Houseboats

- 12.297 LB Wandsworth remains concerned about the houseboats at Nine Elms Pier at Kirtling Street; the owners/occupiers of the houseboats are also concerned. The owner/representative of Nine Elms Pier states in the final written submission (REP495) that *'Appendix C: Houseboat mitigation and compensation policy, together with yet to be seen houseboat TAP's, offers little certainty either for houseboat owners or residents. In consequence there is currently no final format document in respect of houseboat mitigation and compensation policy upon which to raise comment'*. We agree; however we note that appendix C²¹¹ of the Policy does identify houseboats as special cases for the assessment for compensation claims resulting from noise and acknowledges that due to the nature and construction of houseboats, they are

²¹⁰ ES, ES Update Report, answer to ExA's Q11.5

²¹¹ Appendix C of appendix 3 in APP209.03, and appendix C of APP210.01

inherently difficult structures to insulate (para 3.3.5). All claims would be assessed on a case-by-case basis. It also commits to TAPs for the houseboats at Putney and Nine Elms Pier (APP201.01, appendix C, section 1).

- 12.298 However, as stated earlier in this chapter (under the heading 'noise from road and river transport'), we do not consider that the effect of noise on the houseboats has been fully assessed with regard to impact from river transport noise. Therefore some houseboats (particularly at Kirtling Street) may have significant impacts from both air-borne and water-borne noise. Also, of particular concern to us is whether noise insulation would be practicable and what outside amenity space would be available to houseboat residents for respite from noise. Therefore we can have no certainty on this matter.

Temporary rehousing

- 12.299 NPS paragraph 4.9.13 refers to Compulsory Acquisition (CA) in extreme cases. Temporary rehousing is not specifically mentioned in the NPS but the Applicant states (APP11, in answer to Q11.36), that its policy had been developed on the assumption that it would not become necessary to offer the option of permanent rehousing and that temporary rehousing would be preferred and would be sufficient. On balance we agree with this assessment especially when considered against the legislative tests for securing CA.
- 12.300 Apart from houseboats (discussed below), the ES does not predict that any temporary rehousing would be required (APP11, answer to Q11.36).
- 12.301 The Non-statutory off-site mitigation and compensation policy (APP210.01) includes trigger levels for temporary rehousing. Following discussions and questioning by the Panel, additional measures for respite from vibration and rehousing have also been included where noise insulation is not possible or practicable (para 5.1.10).
- 12.302 As with noise insulation we questioned how the trigger levels should be related to the SOAEL level and agree in principle that temporary rehousing should be triggered at a higher level than noise insulation. This is in accordance with BS5228-1, annex E where it is stated that noise trigger levels for temporary rehousing should be set at 10dB above the trigger level in table E.2 or 10dB above the pre-construction ambient, whichever is the higher. The Applicant's proposals comply with these parameters and we are satisfied that the trigger levels for noise are satisfactory on this basis.

Houseboats

- 12.303 The ES identifies those properties that may be eligible for temporary rehousing (APP11, para 36.16), which are:

- two houseboats at Putney Pier
- 21 houseboats at Nine Elms Pier. Five of these houseboats would have to be relocated for the construction of a conveyor to take excavated material to the new jetty.

12.304 The Non-statutory off-site mitigation and compensation policy also states that houseboat owners and tenants may be eligible for temporary rehousing, which could include rehousing on land or relocation of houseboats and/or residents (APP210.01, appendix C, para 1.1.2). However, we have been advised that alternative moorings are difficult to obtain²¹². From oral evidence provided at the CA hearings we understand that the Applicant has identified 25 houseboats as being currently available for occupation, but no vacant moorings have been identified for the temporary relocation of affected houseboats.

12.305 Appendix C of the Policy does seek to secure the ability of houseboats to return to moorings post-construction, but this cannot be guaranteed (para 3.5.1).

12.306 Therefore we can have no certainty on this matter.

Noise and vibration trigger values- Requirement PW17 (temporary rehousing)

12.307 Earlier in this chapter we discussed the Applicant's draft Requirement PW17 with regard to noise insulation. The draft requirement also covers temporary rehousing but it is inconsistent²¹³ with APP210.01 and the Legal Agreement for Securing of Off-site Mitigation Policies and Resources for Local Planning Authorities (APP209.03). These differences are in three areas:

- The Non-statutory off-site mitigation and compensation policy (appendix 3 in the legal agreement, APP209.03) includes time periods for exceedance of the trigger values before temporary rehousing would be offered of 'at least ten days out of any period of 15 consecutive days or alternatively for 40 days in any six-month period'. PW17, on the other hand, does not include a time period qualifier for temporary rehousing²¹⁴ and is therefore more generous than the Policy. The Applicant does not give a reason for this, but we assume that this is a deliberate change to ensure that receptors would not have to be exposed to SOAEL plus 10dB for any period, therefore effectively avoiding the impact.
- There is no specific mention of the houseboats in PW17 as special case properties. We consider that this is probably an

²¹² As stated by the Applicant in evidence to the CA hearings

²¹³ This inconsistency is in addition to the inconsistencies discussed earlier under the heading 'noise insulation'

²¹⁴ Time qualifiers, PW17 para 2.3.1 and 2.3.2 only refer to noise insulation

omission as they were the only receptors identified in the ES as requiring temporary relocation.

- PW17 does not give eligibility for temporary rehousing where noise insulation cannot reasonably be installed due to the nature or type of the building. We consider this is probably also an omission, as it was added to the Policy during the examination to give certainty that rehousing would be available in this scenario. Without this addition we cannot have certainty that above SOAEL levels in the home would be avoided.

12.308 LB Tower Hamlets has commented with regard to vibration trigger levels in PW17, and considers that in respect to ground-borne vibration the VDV parameter currently proposed for daytime and night-time are at the higher limit of BS6472's adverse comment possible range. Therefore it considers that either the lower level should be used, which is half the value detailed in PW17, or at worst a mid-way point should be adopted. The Council's own and preferred ground-borne noise limit is '*L_{Amax}(f) 35dB and, at worst not be more than L_{Amax} 40dB*' (REP492). This suggested requirement was published on 11 March 2014, at the end of the examination, so the Applicant did not have the opportunity to respond.

12.309 Notwithstanding this, we note from BS6472 that the Applicant's trigger level is also at the bottom of the range 'adverse comment probable', and that '*temporary respite will be triggered if the predicted or measured vibration exceeds the trigger levels in the property for more than one day*' (PW17, paragraph 3.2). We also note that the trigger level for vulnerable people would be divided by two (PW17, paragraph 4.2.2). In view of the short-term exposure before respite accommodation would be offered we are satisfied that the trigger levels for vibration are appropriate.

Summary - off-site mitigation

12.310 The Applicant has developed an off-site mitigation policy to provide noise insulation (amongst other matters) and temporary rehousing when on-site mitigation measures have been exhausted and significant impacts still remain at receptors. The Policy as drafted complies with the example trigger levels in BS5228, which are not generally challenged.

12.311 However, as discussed earlier, to ensure that adequate off-site mitigation is available to all receptors that would experience noise levels at or over SOAEL, we consider that additional pre-construction ambient noise measurements would be required. This is considered further in chapter 20 as an additional project-wide requirement.

12.312 We consider that temporary rehousing would fall into the category of 'avoid' and 'prevent' in the NPPG noise hierarchy, with 'prevent'

being appropriate where there would be an unacceptable level of impact (where the effect is noticeable and very disruptive to the point of regular sleep deprivation and/or awakening which could cause medically definable harm). Therefore temporary rehousing would have to be offered where SOAEL cannot be achieved through mitigation, by noise insulation or by avoiding the noise.

12.313 The draft DCO Requirement PW17 goes some way to ensure that off-site mitigation would be offered above SOAEL levels, however, the following inconsistencies²¹⁵ need to be addressed:

- Paragraph 4.2.1 would need to be amended to 'minus 10dB' from 'minus 5dB' to be consistent with the Policy.
- Eligibility for temporary rehousing and trigger levels for when noise insulation is not possible or practicable.
- Houseboats as special case properties.

These matters are discussed in chapter 20.

12.314 We have no certainty on what off-site mitigation could be available to houseboats. We are aware that surveys and discussions are ongoing, but in the absence of detailed proposals before us, we can give this little weight.

IMPACT ON HEALTH AND QUALITY OF LIFE FROM NOISE AND VIBRATION IN CONSTRUCTION

12.315 Implicit in NPS paragraph 4.9.9 is that we need to have an understanding of what the impacts of noise and vibration would be on the health and quality of life of those that would be exposed to adverse impacts. The NPPG also gives us guidance in this matter, as it refers to examples of outcomes for each effect level, these include changes in behaviour, sleep patterns and the potential changes to quality of life due to changes in the acoustic character of the area (see section in this chapter under the heading 'national planning practice guidance').

12.316 The impacts of the proposed development are considered in detail in chapter 13 on 'socio-economic effects, including the effects on amenity, health and well-being'. In this section we report on the impacts on health and well-being from noise alone.

12.317 A summary assessment was provided by the Applicant in answer to the ExA's Q33.3 and Q33.4 for residential households within 250m of the sites, vulnerable people and children who both live and go to school near the sites. The left hand column in the tables in the Applicant's response gave the noise and vibration impacts on quality of life as different intensities: low, medium and high. These were combined with the other constituent parts, and

²¹⁵ Inconsistencies with the Non-statutory off-site mitigation and compensation policy

embedded measures to determine the impacts on each group of receptors (APP60, tables 4.1 to 4.24).

12.318 The Applicant indicated that all sites would have either 'low', 'low to medium' or 'medium' impact on quality of life from noise and vibration except for the following which were all predicted as having a 'low to high' intensity impact:

- Putney Embankment Foreshore
- Cremorne Wharf
- Kirtling Street
- Victoria Embankment
- Shad Thames Pumping Station
- Chambers Wharf
- Earl Pumping Station
- Bekesbourne Street.

12.319 The local authorities maintain their concern about the impacts from noise and vibration, eg LB Southwark states that '*the applicant has underestimated the full extent of the impacts upon people living, learning and working around the site at Chambers Wharf*' (REP491).

12.320 We appreciate that it is difficult to assess what the impacts would be on the quality of life from noise for many, but we consider that there appears to be a lack of acknowledgment that there would be an issue. This is compounded by the Applicant's methodology for noise assessment which considers significant impacts internally for residential households and not at the façade. We have assessed that there would be between 300 and 1,800 households with significant impacts from noise (depending on the methodology used²¹⁶).

12.321 Even with the mitigation measures before us and secured in the DCO, and CoCP Part B, we consider that there would remain significant impacts on health and quality of life from noise during the construction period (eg at Kirtling Street and Earl Pumping Station). The Applicant has gone some way in its proposals in seeking to avoid significant impacts and mitigate and minimise adverse impacts. Noise insulation and/or temporary rehousing would be available to those properties which are predicted to have a significant impact above SOAEL. Subject to noise insulation being effective and ventilation being available, they should be protected in the home.

12.322 There are also properties which have been designated as being significantly affected because they are in a category A or B area, (in accordance with BS5228 ABC methodology), that would be exposed to a high increase in noise level which could affect the quality of life and character of the area. These would not be able

²¹⁶ Refer to section in chapter 12, under the heading 'noise at residential receptors'

to claim noise insulation because they would be below the SOAEL trigger level (eg Wheat Wharf at Shad Thames Pumping Station). There are also many properties which would have a significant effect at the façade but have been assumed by professional judgement not to be significantly affected (eg Free Trade Wharf (middle) at King Edward Memorial Park Foreshore).

12.323 We consider that the quality of life impacts from noise should also take into account the impact on residential households when they are outside the dwelling, for example in the garden, on their balcony or walking to work, school, or local amenities. This is particularly a concern when construction is planned to cover many years.

12.324 The NPPG guidance²¹⁷ refers to noise changing the acoustic character of an area. It also states that the noise impact may be partly off-set if the residents have access to relatively quiet amenity space or a relatively quiet, protected external publically accessible amenity space (eg public park or a local green space designated because of its tranquillity) that is nearby (eg within a 5 minute walking distance).

12.325 As stated earlier the three main drive sites which would operate during the night-time and across extended working hours would be close to residential areas. We remain particularly concerned for residents and children who live, work and go to school in the immediate vicinity of the sites, particularly with regard to the long duration of the works and 24 hours working.

12.326 Therefore, in summary as stated earlier in this chapter, we consider that the assessment is likely to understate the impact from noise on residents because it only considers the internal impact in the home. We therefore also consider that it is likely to understate the impact on quality of life. This is carried forward to the conclusions on the NPS tests.

CONCLUSIONS ON NOISE AND DISTURBANCE

12.327 We have assessed the subject of noise and disturbance against the NPS paragraphs 4.9.9, 4.9.11, 4.9.12 and 4.9.13.

12.328 The Applicant's view on each of the aims of NPS paragraph 4.9.9 are summarised in its letter dated 11 March 2014 (APP197) and given earlier in this chapter under the heading 'Applicant's approach to noise policy'.

²¹⁷ NPPG paragraph 009, reference ID: 30-009-20140306

Avoid significant adverse impacts on health and quality of life from noise (NPS, para 4.9.9)

- 12.329 On the first aim, the Applicant considers that the NPS relates to significant observed adverse effects as defined by NPPG and NPSE and not the definition of significant effect in the ES. We agree with this distinction.
- 12.330 The approach of the Applicant to the application of the NPS, in our view, raises some difficulties as we consider that it is implicit that consideration should first be given to avoiding (by either not creating or by designing out the noise), then seeking to mitigate that which cannot be avoided or designed out and then finally and only when other forms of noise mitigation have been exhausted mitigate by providing noise insulation.
- 12.331 Our view is that the proposed development cannot be said to avoid significant adverse impacts on health and quality of life from noise. The significant adverse impacts that would occur are obviously greater at some sites than others. There are a number of sites with residential development adjacent and in close proximity which would experience significant adverse noise levels (above SOAEL), eg Kirtling Street, Shad Thames Pumping Station, Earl Pumping Station, King Edward Memorial Park and Bekesbourne Street.
- 12.332 Our other concern with regard to the Applicant's approach is that it continues on the ES methodology assumption that significant effects can only be experienced inside dwellings, and ignores the effects on the acoustic character of the area. It also does not sufficiently take into account the duration of the effect and the fact that significant effects might be experienced by receptors that are exposed to noise both during the night and day for a significant time period.
- 12.333 We consider that the noise assessment has not fully considered the effects on houseboats. Significant adverse effects from air-borne noise have been identified but the effects of water-borne noise have not been fully taken into account. The Applicant agreed to undertake further surveys at a late stage in the examination but the results of these surveys are not before us.
- 12.334 Therefore we consider that the proposed development does not meet the first aim of the NPS test. We consider the effectiveness of off-site mitigation below.

Mitigate and minimise adverse impacts on health and quality of life from noise (NPS, para 4.9.9)

- 12.335 On the second aim, the Applicant advises us that the NPS relates to observed adverse effects and that these occur when the noise exposure is between LOAEL and SOAEL. It goes on to state that observed adverse effects have been assessed in the ES (against the A and B thresholds of BS5228 ABC methodology) and by

taking into account noise level, duration and number of dwellings affected, can be reported as a significant effect in the ES. Again, we agree with this distinction.

- 12.336 We have considered this aim in two sections, the first considering the noise assessments as presented in the ES and then considering the areas which we consider are omissions.
- 12.337 We agree with the Applicant's assumption that the second aim relates to mitigation and minimising adverse effects, and agree with its interpretation of this being when noise levels are between LOAEL and SOEAL.
- 12.338 We acknowledge that the mitigation measures (both on-site and off-site) were much improved through the examination process and that these would be secured through CoCP Part B. The Applicant has stated in the ES Update Report that more mitigation measures would not be practicable on each site. The Applicant's final letter also stated that on-site mitigation has been maximised (APP197, para 9.1.7g).
- 12.339 Furthermore, we note and are satisfied that the contractor would be required to produce a noise management plan, a CEMP and would require s61 CoPA consent from the local authority for each work site. We consider that, as suggested by the Applicant, some additional mitigation measures could be agreed with the contractor at that stage with regard to site layout and other detailed matters which could further minimise noise from a site.
- 12.340 However, an additional mitigation measure that was proposed in the examination by a number of Interested Parties was the restriction of Saturday working at King Edward Memorial Park Foreshore. We consider that this is a measure that can secure further on-site mitigation and minimisation and should be accommodated to minimise impacts at receptors at weekends at this site. This is reported on further in chapter 20.
- 12.341 Therefore with regard to minimising and mitigating the typical monthly construction noise levels that have been reported to us, it is not unreasonable to conclude that on this basis the second aim of NPS paragraph 4.9.9 can be met.
- 12.342 However, there remain what we consider to be gaps in the noise assessment:
- The Applicant assumes that significant effects (or observed adverse effects) are only experienced inside dwellings, and does not take into consideration the effects on the acoustic character of the area with regards to the perceived change in the quality of life. It acknowledges through the ABC methodology that a significant impact might occur at a lower construction noise level in quieter areas, but this was

assessed using professional judgement into an impact inside the property and not at the external façade of the property.

- We have no identifiable information regarding 'distinctive tonal, impulsive or low frequency characteristics of noise', and the possible disturbance that might arise from such noise characteristics and types, particularly at night.
- Nor is there an appropriate noise limit before us to control such noise levels, or even information to understand if such a limit would be practicable.
- The survey of water-borne noise on the houseboats is not before us.

12.343 We are therefore unable to report more widely on the mitigation and minimisation of noise levels, in relation to matters on which we have no evidence. As set out below, the Panel having considered all the mitigation proposals conclude that, despite the uncertainties set out above, the proposals do on balance and taken overall meet the second aim of mitigate and minimise adverse impacts on health and quality of life. However, it should be noted (as set out in chapter 18 under the heading 'noise and disturbance') that the Panel considers that the absence of this information, and the difficult position it places the decision maker in seeking to reach a conclusion in respect of whether the proposals do accord with the NPS, is a factor which weighs against making the DCO.

Where possible, contribute to improvements to health and quality of life through the effective management and control of noise (NPS, para 4.9.9)

12.344 On the third point of NPS paragraph 4.9.9 the Applicant advises us that where residents elect to retain the off-site mitigation provided (ie noise insulation), it would reduce exposure to existing noise sources, thus improving their existing situation over the short and long term. Hence the Applicant considers that it has met the third aim of NPS paragraph 4.9.9.

12.345 We agree that some of the TAPs would give a real long term benefit to recipients eg Riverside Primary School and St Joseph's RC Primary School. In the case of houses which currently have single glazing, we also agree that the provision of double glazing would also provide a long term benefit.

12.346 However, we do not consider that this would be an improvement that would be retained in all cases; particularly in properties that already have double glazing and might require greater intervention to the fabric of the building, and/or may result in other compromises or impacts that are not on balance beneficial in the absence of the work site impacts.

12.347 However we note that this aim is only to be applied where possible, therefore we agree that the Applicant has demonstrated that it has addressed this third aim of paragraph 4.9.9 of the NPS.

Off-site mitigation measures (NPS, para 4.9.13)

12.348 Our view of the application of NPS paragraph 4.9.13 is that it should come into effect when the options for compliance with paragraph 4.9.9 have been exhausted (ie the options of design, site selection and engineering out the significant adverse impacts and mitigating and minimising adverse impacts). In that case paragraph 4.9.13 directs applicants to consider noise insulation and in extreme cases compulsory purchase. On this project, the Applicant has assessed temporary rehousing as opposed to compulsory purchase and we would agree with that approach.

12.349 The Applicant's Non-statutory off-site mitigation and compensation policy provides for both noise insulation and temporary rehousing. The Policy would be secured through legal agreements with the local authorities or by unilateral obligation²¹⁸ (APP209.03). The threshold levels for noise insulation and temporary rehousing are not generally disputed. However, there are matters which are still outstanding, not least of which is whether noise insulation would be effective in all types of sensitive receptors.

12.350 The intention is that off-site mitigation measures, through both noise insulation and temporary rehousing, would be available above SOAEL levels and the Applicant has drafted a new DCO Requirement PW17 to ensure this. However, as discussed earlier, this was submitted on 3 March 2014 and there are omissions and inconsistencies between both the noise insulation and temporary rehousing qualification areas of the Policy and the draft PW17 (APP209.03). We consider that these inconsistencies could be addressed in the drafting of PW17, as discussed in chapter 20.

12.351 As stated earlier, (in this chapter under the heading 'Baseline issue'), we consider that additional baseline noise measurements are required, before work starts on site, at sensitive receptor façades. This should be at locations to be agreed with the relevant local planning authority. This is particularly relevant to the eligibility for noise insulation for those properties which do not currently qualify for or have a commitment to a TAP. We consider that this could also be addressed in drafting and this is also discussed further in chapter 20.

12.352 The houseboats are referred to in appendix C of the Non-statutory off-site mitigation and compensation policy as special cases. A commitment to TAPs is included for some houseboats. However, apart from temporary rehousing for residents, we have no certainty as to what off-site mitigation would be available to

²¹⁸ s106 of the Town and Country Planning Act 1990 as amended by s174 of PA 2008

houseboats. We are aware that surveys and discussions are ongoing, but in the absence of detailed proposals before us we cannot give this any significant weight. However, we consider that this could be addressed to some degree in the drafting of Requirement PW17 and this is discussed further in chapter 20.

12.353 In conclusion, our view is that the amendments to the draft Requirement PW17 and the additional baseline requirement would ensure that noise insulation and temporary rehousing would be satisfactorily available for significantly affected receptors. Accordingly, subject to these amendments being included in the DCO, we consider that the Applicant has met the requirements of NPS paragraph 4.9.13.

Implications for the DCO (NPS, para 4.9.11)

12.354 The NPS paragraph 4.9.11 considers that the decision maker may wish to impose requirements to ensure delivery of the Applicant's mitigation measures.

12.355 As discussed earlier, there are a number of requirements that we consider should be included or modified within the DCO, for the construction phase of the project. These are discussed in chapter 20, but in summary the additional requirements or modification of requirements that relate to noise mitigation are:

- PW17, with modifications to ensure that it is consistent with the Non-statutory off-site mitigation and compensation policy with regard to noise insulation and temporary rehousing through appropriate trigger levels
- a new requirement for the measurement of baseline at the façade of receptors, which would then ensure delivery of off-site mitigation to eligible receptors
- a site-specific requirement to restrict Saturday working at King Edward Memorial Park Foreshore.

12.356 The inclusion of these requirements is given weight in our final assessment.

Overall conclusions on noise and disturbance

12.357 Our overall assessment of the NPS tests is that with regard to the three aims in NPS paragraph 4.9.9:

- we do not consider that the proposals meet the first aim of the NPS test to avoid significant adverse impacts on health and quality of life from noise, although we do take into account NPS paragraph 4.9.13 below
- on the second aim, we consider that on balance the proposals can be said to meet the aim of mitigating and minimising adverse impacts on health and quality of life from noise, however we consider that there are significant uncertainties on which we are unable to report

- on the third aim, we note that the aim is to be achieved 'where possible', and consider that the proposals would meet this aim.

12.358 We have considered the off-site mitigation measures, offered by the Applicant in accordance with NPS paragraph 4.9.13, and consider that they would be satisfactory subject to the requirements we propose and discuss in chapter 20.

12.359 We consider that the ES is likely to have understated the impact from noise and disturbance. Moreover, we are unable to conclude by how much the impacts are understated because of the uncertainties reported above.

12.360 Overall we conclude that noise and disturbance is a matter which weighs against making the DCO. This conclusion is carried forward to our overall consideration in chapter 18.

APPENDIX 21B EXTRACTS FROM HEATHROW CRANFORD DECISION



Department for
Communities and
Local Government



Department
for Transport

Our Ref: APP/R5510/A/14/2225774
Your Ref: 41473/APP/2013/1288

Heathrow Airport Limited
The Compass Centre
Nelson Road
London Heathrow Airport
HOUNSLOW
TW6 2GW

2 February 2017

Dear Sirs

**TOWN AND COUNTRY PLANNING ACT 1990 – SECTION 78
APPEAL MADE BY HEATHROW AIRPORT LIMITED
ENABLING WORKS TO ALLOW IMPLEMENTATION OF FULL RUNWAY ALTERNATION
DURING EASTERLY OPERATIONS AT HEATHROW AIRPORT
APPLICATION REF: 41573/APP/2013/1288**

1. We are directed by the Secretaries of State for Communities & Local Government and for Transport (the Secretaries of State) to say that consideration has been given to the report of L Rodgers BEng(Hons) CEng MICE MBA who held a public local inquiry, which opened on 19 June 2015 and which was closed in writing on 4 August 2015, into your Company's appeal against the decision of the London Borough of Hillingdon (LBH) to refuse planning permission for enabling works to allow implementation of full runway alternation during easterly operations at Heathrow Airport, in accordance with application ref 41473/APP/2013/1288 refused by notice dated 21 March 2014.
2. On 23 October 2014 this appeal was recovered for determination by the Secretaries of State in pursuance of s266(1) of the Town and Country Planning Act 1990.

Inspector's recommendation and summary of the decision

3. The Inspector recommended that the appeal be allowed and planning permission granted.
4. For the reasons given below, the Secretaries of State agree with the Inspector's conclusions and recommendations. A copy of the Inspector's report (IR) is enclosed. All references to paragraph numbers, unless otherwise stated, are to that report.

Department for Communities and Local Government
Jean Nowak
Planning Casework
3rd Floor Fry Building
2 Marsham Street
London SW1P 4DF
Email : PCC@communities.gsi.gov.uk

Department for Transport
Ian Elston
Aviation Policy Division
1/25 Great Minster House
33 Horseferry Road
London SW1P 4DR

Representations received following the closure of the inquiry

5. On 26 January 2016, the Secretaries of State wrote to the appeal parties to afford them an opportunity to comment on any implications for the cases which they had put at the inquiry of the Inspector's recommendation that, if the appeal were to be allowed, the noise insulation scheme should be made available to those households which would otherwise only be entitled to relocation assistance. This was in accordance with the Inspector's recommendation at IR1192; and a list of representations received in response to this letter is at Annex A. All the representations received, with the exception of that from HAL, strongly supported the Inspector's recommendation as a minimum. HAL considered that any such condition should await a full review of aviation policy and airspace change, but they indicated that they would not resist the additional condition recommended by the Inspector.
6. Annex A, also includes a list of general post-inquiry representations received from parties. Copies of all these letters may be obtained on written request to the DCLG address at the foot of the first page of this letter.

Environmental Statement

7. In reaching their decision, the Secretaries of State have taken into account the Environmental Statement (ES) which was submitted under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. Having taken account of the Inspector's conclusions on the ES at IR949-951 and the preceding arguments on which they are based, the Secretaries of State are satisfied that, despite its shortcomings, the ES complies with the above Regulations and that sufficient environmental information has been provided for them to assess the environmental impacts of the proposal.

Statutory and policy considerations

8. In reaching their decision, the Secretaries of State have had regard to section 38(6) of the Planning and Compulsory Purchase Act 2004 which requires that proposals be determined in accordance with the development plan unless material considerations indicate otherwise.
9. In this case the adopted development plan for the area comprises the London Plan, the LBH's Local Plan and the Further Alterations to the London Plan Document, published in March 2015. The Secretaries of State consider that the development plan policies of most relevance to this case are those set out at IR847-850.
10. Other material considerations which the Secretaries of State have taken into account include the National Planning Policy Framework ('the Framework') and associated planning guidance ('the guidance'); the Noise Policy Statement for England (NPSE) (IR853); and the Aviation Policy Framework (APF) (IR854).

Main issues

11. The Secretaries of State agree with the Inspector that the main issues are those set out at IR844.

Green Belt

12. The Secretaries of State have taken account of the policy position as set out by the Inspector at IR952-957, and agree with him at IR957 that, where there is an

inconsistency between development plan policies and the Framework, the weight accorded to the development plan policies must be reduced in accordance with paragraph 215 of the Framework. For the reasons given at IR958-965, the Secretaries of State agree with the Inspector at IR965 that, where the proposed acoustic barrier would be located in the Green Belt, it should be deemed inappropriate development and should not be approved except in very special circumstances. Furthermore, having carefully considered the Inspector's discussion on the effect of the proposed development on openness at IR966-967, the Secretaries of State agree with his conclusion at IR967 that the proposed barrier would materially and adversely affect the openness of the Green Belt. The Secretaries of State have gone on to consider these harms in the context of the overall balance to determine whether the very special circumstances necessary to justify the development exist (see paragraphs 18-19 below).

Character and appearance of the area

13. The Secretaries of State agree with the Inspector (IR968) that the proposed works within the airport boundary, save for the proposed barrier, are minor and consistent with the existing airport infrastructure so that they would have no material impact on the area's character and appearance. They also agree that, for the reasons given at IR969-970, the proposed barrier would result in some limited harm to the general character and appearance of the area contrary to UDP policies BE13 and BE19. However, for the reasons given at IR971, the Secretaries of State agree with the Inspector that the proposed barrier would not affect the significance of the nearby conservation area. They also agree with the Inspector that the proposed noise barrier needs to be taken into account in assessing the impact on the Green Belt and on the character and appearance of the area in the overall planning balance (see paragraph 22 below).

Living conditions - noise

14. The Secretaries of State agree with the Inspector at IR840 that the Government's decision that the Cranford Agreement should be ended means that the issue that lies at the heart of this appeal is whether the proposed mitigation and compensation measures for those likely to be affected by the proposals can be regarded as "appropriate".
15. On this basis, and having carefully considered the points made by the Inspector at IR972-1115, along with the comments received in response to the reference back exercise referred to at paragraph 5 above, the Secretaries of State agree with the Inspector's conclusions within those paragraphs and at IR1116-1122 on mitigation and compensation for noise. In particular, the Secretaries of State have given careful consideration to, and agree with, the Inspector's analysis and conclusions on the impact of noise on residential properties (IR1081-1100). They also agree with him that HAL's proposed mitigation in regard to schools can be regarded as appropriate (IR1111); and with regard to his conclusions on community buildings and outdoor areas (IR1112-1113). Furthermore, they agree that the noise barrier would form an appropriate part of the overall mitigation package (IR1116).
16. With regard to the Inspector's conclusions on the impact of noise on living conditions (IR1117-1122), the Secretaries of State agree with him that the noise mitigation measures proposed by your Company should be supplemented by the provision of the "Cranford-specific" insulation scheme to which the Inspector refers at IR1122 and which he proposes should be imposed as a condition in granting planning permission (see paragraph 20 below). They agree with the Inspector that such measures would be proportionate, particular to the development, adequate and appropriate, and in

compliance with the development plan, the Framework and guidance and the NPSE. They also consider that it would be in line with the expectation of the Coalition Government, when announcing the cessation of the Cranford Agreement in 2010, that appropriate mitigation and compensation measures would be provided for those likely to be adversely affected by the ending of that Agreement (IR18).

Living conditions – air quality

17. Turning to the issue of air quality, the Secretaries of State have carefully considered the Inspector's review of the policy and guidance framework applicable to air quality (IR1132-1139) and his assessment of effects (IR1140-1158); and they agree with his conclusion at IR1158 that there would seem to be little doubt that the development would lead to a worsening of some already significant exceedances of the EU limit value. With regard to mitigation (IR1159-1170), the Secretaries of State agree with the Inspector's conclusions at IR1171 that mitigation of the air quality effects of the proposed development is necessary and justified and that the proposed mitigation would be reasonable, proportionate and sufficient to adequately mitigate the adverse effects of the development so that there would be no conflict with the development plan in this regard.

Whether other considerations amount to very special circumstances

18. For the reasons given at IR1172-1175, the Secretaries of State agree with the Inspector that the noise barrier is a necessary part of the development which is intended to implement Government policy to redistribute noise more fairly around the airport; and that the public interest benefits that would result from the development (with appropriate mitigation) should carry very substantial weight in favour of the scheme (IR1173). The Secretaries of State also give moderate weight to the benefit which the barrier would bring in terms of operational robustness and some modest weight in favour of the development to the beneficial effects which would be experienced elsewhere (IR1175). However, they also agree with the Inspector (IR1174) that it would not be appropriate to discuss any change to the Green Belt boundary in the context of this appeal.
19. The Secretaries of State have gone on to consider whether the material considerations identified in the previous paragraph as benefits of the scheme amount to very special circumstances which would outweigh the harm caused by the construction of that part of the noise barrier in the Green Belt (as identified at paragraph 11 above) and, for the reasons given by the Inspector at IR1176-1177, they agree with his conclusion at IR1178 that the very special circumstances necessary to justify the development do exist.

Planning conditions

20. The Secretaries of State have considered the Inspector's analysis at IR1179-1192, the recommended conditions set out at the end of the IR and the reasons for them, national policy in paragraph 206 of the Framework and the relevant guidance. They are satisfied that the conditions recommended by the Inspector, including the "Cranford-specific" condition which now forms condition 9 (see paragraph 16 above), comply with the policy test set out at paragraph 206 of the Framework and that the conditions set out at Annex B should form part of their decision. The NPSE and the APF require airport operators, when considering developments which result in an increase in noise, to ensure that they offer "appropriate compensation" to those potentially affected. The Secretaries of State accept that imposing this additional condition goes beyond the minimum expressly referred to in the APF, by imposing an enhanced mitigation package beyond that minimum. They nevertheless consider the enhanced mitigation required by this additional

condition to be appropriate in this case and necessary to make this proposal acceptable to those most directly adversely affected by this scheme, for the reasons given by the Inspector at IR1122.

Planning obligations

21. Having had regard to the Inspector's analysis at IR1193-1203, the two Unilateral Undertakings submitted on 22 July 2015, paragraphs 203-205 of the Framework, the guidance and the Community Infrastructure Levy Regulations 2010 as amended, the Secretaries of State agree with the Inspector's conclusion at IR1203 that these obligations comply with Regulations 122 and 123 of the CIL Regulations and the tests at paragraph 204 of the Framework and are necessary to make the development acceptable in planning terms, directly related to the development, and fairly and reasonably related in scale and kind to the development.

Planning balance and overall conclusion

22. For the reasons given above, the Secretaries of State consider that the appeal scheme is in general accordance with the development plan as a whole. For the reasons given above, they also consider that the appeal scheme is in general compliance with relevant national policy and guidance. With regards the Inspector's proposed additional condition, they consider that, whilst it goes beyond the minimum expectation expressly referred to in current national policy and guidance, it is consistent with the expectation that compensation be appropriate and that the additional mitigation it would provide is necessary to make this proposal acceptable. Although those parts of the acoustic barrier located in the Green Belt would constitute inappropriate development, with some harm to the openness of the Green Belt and the character and appearance of the area, the Secretaries of State are satisfied that there are very special circumstances to justify its construction. They are also satisfied that the proposed mitigation measures, including the "Cranford-specific" compensation scheme proposed by the Inspector, would be adequate to mitigate the adverse effects of the development. The Secretaries of State therefore conclude that the appeal be allowed and planning permission granted.

Public Sector Equality Duty

23. In accordance with section 149 of the Equality Act 2010, due regard has been given to the need to (a) eliminate discrimination, harassment, victimisation; (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it. The Secretaries of State have considered the protected characteristics of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, and sexual orientation. They have concluded that noise is the only factor which could give rise to any disproportionate impacts on persons with protected characteristics in respect of section 149(1) (a-c).
24. The Secretaries of State have also concluded that, in relation noise impacts, allowing the appeal would have disproportionate negative impacts on those persons living in the vicinity of Heathrow Airport with the protected characteristics of race (people of Asian/Asian British ethnicity) and religion or belief (Muslim and Sikh religion) as compared with persons living in the vicinity who do not share these characteristics. However, the Secretaries of State have also concluded that imposing the additional condition recommended by the Inspector could reduce those disproportionate negative

impacts on those persons as they could benefit from the enhanced mitigation provided by the condition and those persons are disproportionately affected by the adverse noise impacts of this proposal. The Secretaries of State have also concluded that allowing the appeal, whether or not the additional condition is imposed, would have disproportionate positive impacts on persons with the protected characteristics of race (white people) and religion or belief (Christian) as compared with persons living in the vicinity who do not share these characteristics.

Formal decision

25. Accordingly, for the reasons given above, the Secretaries of State agree with the Inspector's recommendation. They hereby allow your company's appeal and grant planning permission subject to the conditions set out at Annex B of this letter for enabling works to allow implementation of full runway alternation during easterly operations at Heathrow Airport, in accordance with application ref: 41473/APP/2013/1288 refused by notice dated 21 March 2014.
26. An applicant for any consent, agreement or approval required by a condition of this permission for agreement of reserved matters has a statutory right of appeal to the Secretaries of State if consent, agreement or approval is refused or granted conditionally or if the Local Planning Authority fail to give notice of their decision within the prescribed period.
27. This letter does not convey any approval or consent which may be required under any enactment, bye-law, order or regulation other than section 57 of the Town and Country Planning Act 1990.

Right to challenge the decision

28. A separate note is attached setting out the circumstances in which the validity of the Secretaries of State's decision may be challenged. This must be done by making an application to the High Court within 6 weeks from the day after the date of this letter for leave to bring a statutory review under section 288 of the Town and Country Planning Act 1990.
29. A copy of this letter has been sent to the Council and Rule 6 parties and notification sent to others who asked to be informed of the decision.

Yours faithfully

Jean Nowak
Jean Nowak

Ian Elston
Ian Elston

Authorised by Secretaries of State to sign in that behalf

RECOVERED APPEAL: WORKS TO ENABLE FULL RUNWAY ALTERNATION DURING EASTERLY OPERATIONS AT HEATHROW AIRPORT: SCHEDULE OF REPRESENTATIONS

Representations received in response to the Secretary of State's letter of 26 January 2016

Party	Date
Cllr George Bathurst	26 January 2016
Cllr Gurpal Viridi	31 January 2016
Cllr John Bowden	17 February 2016
Cllr John Lenton & Margaret Lenton	17 February 2016
Cllr Malcolm Beer and Cllr Lynne Jones	17 February 2016
Hazel Cooper	17 February 2016
Stephen Allen, Heathrow Airport Limited	17 February 2016 and 17 March 2016
Colin Stanbury, Local Authorities' Aircraft Noise Council	17 February 2016
Mr Galwant Gill	17 February 2016
Mr P Tomson, Spelthorne Borough Council	17 February 2016
Wraysbury Parish Council	17 February 2016
Sarah White, LB Hillingdon – joint response obo Greater London Authority, LB Hillingdon and LB Hounslow	22 February 2016, 23 February 2016 and 17 March 2016
Colnbrook with Poyle Parish Council	17 March 2016

General post-inquiry Representations

Party	Date
Sandy Kidd, Historic England	15 June 2015
Cllr John Lenton	18 June 2015
Wisdom Da Costa	19 October 2015
Sarah Berwick	29 October 2015

[Page not used]

Annex B

Conditions

1. The development hereby permitted shall begin not later than three years from the date of this decision.
2. The development hereby permitted shall be carried out in accordance with the following approved plans:

Fig 2.1_29528-A91 Current Airfield Layout

10000-XX-GA-100-000191 v. 1.0 Site Location Plan

10000-XX-GA-100-000192 v. 1.0 Proposed Layout Plan

10000-XX-GA-100-000193 v. 1.0 New Pavement and Breakout Areas

10000-00-GA-XXX-000149 v. 1.0 Noise Barrier Detailed Plan A

10000-00-GA-XXX-000150 v. 1.0 Noise Barrier Detailed Plan B

10000-00-GA-XXX-000151 v. 1.0 Noise Barrier Detailed Plan C

10000-00-GA-XXX-000148 v. 1.0 Noise Barrier General Arrangement

10000-00-GA-XXX-000143 v. 3.0 Noise Barrier Section AA

10000-00-GA-XXX-000144 v. 1.0 Noise Barrier Section BB

10000-00-GA-XXX-000153 v. 2.0 Site Boundary for construction and site

10000-00-GA-XXX-000145 v. 2.0 Site Compound and Access Route

10000-00-GA-XXX-000142 v. 4.0 Noise Barrier Site Location Plan

10000-00-SE-XXX-000001 v. 1.0 Noise Barrier Typical Cross Sections

3. No development shall take place until a noise barrier landscaping scheme has been submitted to and approved in writing by the local planning authority. The scheme shall include detailed planting plans, a planting specification and a schedule of landscape maintenance for a minimum period of 5 years from implementation. The approved landscaping scheme shall be implemented in the first planting season following completion of the noise barrier and shall thereafter be maintained in accordance with the approved schedule of landscape maintenance.
4. No development shall take place until full details of the noise barrier have been submitted to and approved in writing by the local planning authority. The details shall include:
 - i. the materials to be used in both the lower three metres and the upper transparent two metre element
 - ii. details of the acoustic properties of the barrier and the noise reduction provided by the materials/structure
 - iii. the means of bird avoidance for the transparent element
 - iv. the means of supporting the fence structure.

Scheduled Easterly Alternation shall not commence until the noise barrier has been fully installed in accordance with the approved details.

5. No development shall take place in Area A13E or LINK 59 until a written scheme of investigation (WSI) for these areas, having regard to the constraints involved when working near to operational runways and taxiways, as identified in the CAA publication CAP 168 (Licensing of Aerodromes) or any replacement or update of that publication, has been submitted to and approved by the local planning authority in writing. No development shall take place in Area A13E or LINK 59 other than in accordance with the

agreed WSI, which shall include the statement of significance and research objectives, and

- The programme and methodology of site investigation and recording and the nomination of a competent person or organisation to undertake the agreed works, and
 - The programme for post-investigation assessment and subsequent analysis, publication & dissemination and deposition of resulting material. This part of the condition shall not be discharged until these elements have been fulfilled in accordance with the programme set out in the WSI.
6. No development shall take place, including any works of demolition, until a Construction Environmental Management Plan has been submitted to, and approved in writing by, the local planning authority. The approved Plan shall be adhered to throughout the construction period.

In relation to the proposed noise barrier, the Plan shall address the following construction related issues (but not limited to):

1. Noise and Vibration Management;
2. Air Quality;
3. Water Quality;
4. Ecology;
5. Visual Impact; and
6. Waste Management.

In relation to the proposed airfield works, the Plan shall address Air Quality matters only.

The measures set out within the Construction Environmental Management Plan shall have regard to best practice guidance and planning policy including, but not limited to, The Mayors 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance'.

7. No development shall take place, including any works of demolition, until a Construction Logistics Plan has been submitted to and approved in writing by the Local Planning Authority (in consultation with Transport for London). The Construction Logistics Plan shall include measures to manage all freight vehicle movements to and from the site identifying efficiency and sustainability measures to be undertaken during site construction of the development. The development shall not be carried out otherwise than in accordance with the approved Construction Logistics Plan or any approved amendments thereto as may be agreed in writing by the Local Planning Authority (in consultation with Transport for London).
8. No development shall take place until drainage details relating to the airfield works have been submitted to and approved in writing by the Local Planning Authority. Development shall thereafter take place in accordance with the approved details.
9. Any property which, after Scheduled Easterly Alternation has commenced, would experience external aircraft noise levels of 69dB LAeq 16hrs or more (referred to in the submitted obligations as a 'Type A Property') shall be offered, as an alternative to relocation assistance, noise insulation on the same terms and in the same form as a property which, after Scheduled Easterly Alternation has commenced, would experience an increase of 3dB or more which results in exposure to external aircraft noise levels of 63dB LAeq 16hrs or more (referred to in the submitted obligations as a 'Type B Property').



Report to the Secretaries of State for Transport and for Communities and Local Government

by L Rodgers BEng (Hons) CEng MICE MBA

an Inspector appointed by the Secretary of State for Communities and Local Government

Date: 9 November 2015

TOWN AND COUNTRY PLANNING ACT 1990

APPEAL BY

HEATHROW AIRPORT LTD

AGAINST THE DECISION OF

THE COUNCIL OF THE LONDON BOROUGH OF HILLINGDON

CONCERNING

**ENABLING WORKS TO ALLOW IMPLEMENTATION OF FULL RUNWAY
ALTERNATION DURING EASTERLY OPERATIONS AT HEATHROW AIRPORT**

Inquiry Held: 2-19 June 2015

Site Visits: 23 June 2015

Inquiry Closed in Writing: 4 August 2015

File Ref: APP/R5510/A/14/2225774

GLOSSARY

AC	Airports Commission
ACC	Adding Capacity at Heathrow: Consultation Document (DfT)
ACD	Adding Capacity at Heathrow: Decisions Following Consultation (DfT)
ACDM	Airport Collaborative Decision Making
ACS	The Closing Statement on behalf of the Authorities
ANASE	Attitudes to Noise from Aviation Sources in England
ANIS	Air Noise Index Study
APEC	Air Pollution Exposure Criteria
APF	Aviation Policy Framework
APU	Auxiliary Power Unit
AQMA	Air Quality Management Area
ATC	Air Traffic Control
ATM	Air Traffic Movement
ATWP	Air Transport White Paper
CA	Conservation Area
CAA	Civil Aviation Authority
CERC	Cambridge Environmental Research Consultants
CIL	Community Infrastructure Levy
DAP	Director of Airspace Policy (CAA)
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EiC	Examination in Chief
ERCD	Civil Aviation Authority - Environmental Research and Consultancy Department
ES	Environmental Statement
ExA	Examining Authority
HACC	Heathrow Area Consultative Committee
HAL	Heathrow Airport Limited
HEIA	Health and Equalities Impact Assessment
HYENA	Hypertension and Exposure to Noise near Airports Study
IAQM	Institute of Air Quality Management
IEMA	The Institute of Environmental Management & Assessment
IPC	Infrastructure Planning Commission
LBH	London Borough of Hillingdon
LBHo	London Borough of Hounslow
LOAEL	Lowest Observed Adverse Effect Level
LoP	London Plan (2015)
LP	Hillingdon Local Plan Part 1: Strategic Policies (2012)
LPA	Local Planning Authority (LBH)
MoL	Mayor of London
NAP	Heathrow Airport Noise Action Plan
NATS	NATS Holdings (formerly National Air Traffic Services)
NNAS	National Noise Attitude Survey
NO2	Nitrogen Dioxide
NOEL	No Observed Effect Level

NOx	Nitrogen Oxides
NPPF	National Planning Policy Framework
NPR	Noise Preferential Routes
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
PBN	Performance Based Navigation
PCM	Pollution Climate Mapping
PIM	Pre-Inquiry Meeting
PINs	The Planning Inspectorate
PoE	Proof of Evidence
PPG	Planning Practice Guidance
PRT	Personal Rapid Transport System
R3	The 'third runway'
RANCH	Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health
RAT	Rapid Access Taxiway
RBWM	Royal Borough of Windsor and Maidenhead
RfR	Reason for Refusal
RPoE	Rebuttal Proof of Evidence
RX	Re-examination
SIDS	Standard Instrument Departures
SOAEL	Significant Observed Adverse Effect Level
SOCG	Statement of Common Ground
SoSCLG	Secretary of State for Communities and Local Government
SoST	Secretary of State for Transport
Soug	Statement of Uncommon Ground (Noise)
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
T5	Terminal 5
TEAM	Tactically Enhanced Arrivals Management
TEDM	Tactically Enhanced Departures Management
The Authorities	London Borough of Hillingdon/London Borough of Hounslow/ Mayor of London
The Council	London Borough of Hillingdon (LPA)
The Secretaries of State	The Secretaries of State for Transport and for Communities and Local Government
TTT	Thames Tideway Tunnel
UAEL	Unacceptable Adverse Effect Level
UDP	The Saved Policies of the Hillingdon Unitary Development Plan (2007) (also adopted in November 2012 to serve for an interim period as the Hillingdon Local Plan: Part 2)
UU	Unilateral Undertaking
VSC	Very Special Circumstances
WHO	World Health Organisation
XX	Cross examination

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Northern Runway, Heathrow Airport (Easting: 5053460 Northing: 1763970)

- The appeal is made under section 78 of the Town and Country Planning Act 1990 against a refusal to grant planning permission.
- The appeal is made by Heathrow Airport Limited against the decision of the Council of the London Borough of Hillingdon.
- The application Ref 41573/APP/2013/1288, dated 29 November 2013, was refused by notice dated 21 March 2014.
- The development proposed is described as "Enabling works to allow implementation of full runway alternation during easterly operations at Heathrow Airport".

Summary of Recommendation: I recommend that the appeal be allowed and planning permission be granted.

PROCEDURAL MATTERS

1. The appeal was recovered for decision by the Secretary of State for Communities and Local Government and the Secretary of State for Transport and the main parties were notified of that recovery by letter dated 23 October 2014. Consequent on that recovery I was appointed to hold an Inquiry into the appeal and report to the Secretary of State for Transport (SoST) and the Secretary of State for Communities and Local Government (SoSCLG) with recommendations.
2. I held a pre-Inquiry meeting (PIM) on the 1 April 2015 to discuss procedural and administrative matters relating to the Inquiry. I was provided with sample notification letters and a list of addressees used by the local planning authority in notifying third parties of both the appeal and the Inquiry and I am therefore satisfied that the proper notification was given.
3. The Inquiry itself opened on the 2 June 2015 and sat for 12 non-consecutive days until being adjourned on the 19 June 2015. At that stage all the oral evidence had been heard and discussions had taken place on the suggested conditions and submitted obligations; there were nonetheless still a number of matters outstanding. Rather than delaying matters unnecessarily with a lengthy adjournment, agreement was reached to deal with all of the outstanding matters, including closings and the finalisation of the s106 obligations, in writing. In consequence of that agreement an exchange of documents¹ took place following the adjournment in accordance with an agreed timetable and protocol². I thereafter closed the Inquiry in writing on the 4 August 2015.
4. Finalised versions of the Unilateral Undertakings by Heathrow Airport Limited (HAL) to the London Borough of Hillingdon³ (LBH) and to the London Boroughs of Hounslow and Hillingdon⁴ were submitted on the 22 July 2015. I have taken them into account as material considerations in coming to my recommendations.
5. Consequent on discussions between the main parties prior to the opening of the Inquiry, HAL agreed to include in its Unilateral Undertaking to LBH a payment of some £540k to be expended on measures to upgrade the existing bus fleet

¹ INQ/49 – INQ/67

² INQ/48

³ INQ/62A

⁴ INQ/62B

operating in Longford such that its emissions would comply with Euro VI standards. The LPA considers this proposal an acceptable means of mitigating the air quality impacts of the development and necessary to make it acceptable in planning terms.

6. Although HAL maintained its position at the Inquiry that there is no need for such mitigation to be provided, HAL nonetheless undertook to draft its Unilateral Undertaking such that payment of those monies was not conditional on that mitigation being found compatible with Regulation 122 of the Community Infrastructure Levy Regulations (CIL Regulations).
7. Subject to that approach being reflected in the drafting of the Unilateral Undertaking the Council accepted that its objections concerning air quality had been overcome and as a result the parties determined not to call their witnesses on air quality. I nonetheless considered it necessary to reach a view on the effects of any air quality impacts resulting from the proposals and whether or not a need had been demonstrated for mitigation. In consequence I determined to deal with the topic of air quality as a 'round table' session with both of the main parties' advocates and air quality witnesses present.
8. Although HAL submitted an Environmental Statement (ES) as part of its Environmental Impact Assessment (EIA), LBH considered the ES deficient in that it ".....fails to comply with relevant Environmental Impact Assessment Regulations 2011....." (RfR3) and ".....fails to provide a cumulative assessment of the proposed development and the associated operational airport changes...."(RfR4). HAL not only disputes this assessment but considers that in any event LBH was not entitled to consider these matters as reasons to refuse the application; instead HAL considers that LBH should, under the Environmental Impact Assessment Regulations 2011, have made a Regulation 22 request for further information. I address this matter in my conclusions as a precursor to the main issues.
9. Insofar as site visits are concerned I was able to observe the site of the proposed runway alterations on an unaccompanied basis from the Terminal 5 building; consequent on those observations I agreed with the main parties that an 'air-side' visit was unnecessary. However, an accompanied site visit to various schools and other locations around the airport took place on the 23 June 2015 after the Inquiry had been adjourned. It followed a pre-agreed itinerary⁵.
10. This report begins with a brief outline of Heathrow Airport and its operations, together with the background to the application and the proposed works, before going on to present the cases for the main parties based on their closing submissions. (The unedited closing submissions are available as part of the Inquiry documents.⁶) A summary of third party representations follows before I then set out my conclusions and recommendations. A list of those appearing at the Inquiry is appended at Annex A, the core documents are listed at Annex B, documents submitted during the course of the Inquiry are listed at Annex C and the suggested conditions are given at Annex D.

⁵ INQ/34

⁶ INQ/63 and INQ/64

"*barrier*" in this location is already firmly established. HAL also suggests that the transparent material in the upper section would minimise any effect on openness and any visual intrusiveness. However, whilst I accept that the transparent section would have some effect in reducing the barrier's visual prominence the full height of the barrier would nonetheless still be obvious (as illustrated by the photomontages at Appendix V of the ES) - and the fact that there is already other development present in the area does not alter the fact that the proposed barrier would increase the overall amount of development in the Green Belt. Consequently I see none of these matters as having any significant effect on my conclusion that the proposed barrier would materially and adversely affect the openness of the Green Belt.

CHARACTER AND APPEARANCE OF THE AREA

968. The proposed works within the airport boundary are minor in nature and consistent with the existing airport infrastructure. In consequence they would have no material impact on the area's character and appearance.
969. However, as noted above, the proposed noise barrier alongside Longford would be materially larger than the existing fence. The photomontages at Appendix V of the ES show that whilst it would have only a limited visual impact in certain views there would be a significant enclosing effect when seen from within the Longford 'pocket park'. It is also likely that the proposed barrier would appear as a bulky and intrusive structure when seen from the direction of the airport perimeter road.
970. The impact of the barrier would however be tempered somewhat both by the use of perspex in its upper section and by the proposed landscaping – which could be secured by condition. I am also conscious that the area surrounding the airport already contains a number of large and, on occasion, fairly utilitarian structures. Indeed, the photomontages show how the barrier would be seen in many views against a background of either T5 (albeit at a distance) or in conjunction with either the Personal Rapid Transport System (PRT) or the 'T5 Business Car Park'. Nonetheless, even taking those matters into account it is my judgement that the proposed barrier would result in some limited harm to the general character and appearance of the area contrary to UDP Policies BE13 and BE19 - which amongst other matters seek for development to harmonise with or complement the character and appearance of an area.
971. Insofar as the nearby conservation area (CA) is concerned I agree with HAL that Longford village tends to 'turn its back' on the airport and that, in addition, much of the south eastern boundary of the CA is quite heavily vegetated. I am also conscious that a number of areas immediately to the south of the CA boundary already appear somewhat utilitarian. In consequence, and despite the barrier causing some limited harm to the general character and appearance of the area, I do not consider that the proposed noise barrier would affect the significance of the nearby CA.

LIVING CONDITIONS – NOISE

Introduction

972. As part of its re-affirmation of the previous Government's decision to end the Cranford agreement, in 2010 the then Minister of State, Department for Transport, stated that "*I will look to BAA to ensure that proper consideration is given to*

appropriate mitigation and compensation measures for those likely to be affected by the proposals."

973. The Authorities accept that the decision to end the Cranford agreement has been made but are nonetheless concerned to ensure that the necessary mitigation is secured by means of conditions or obligations [188]. Clearly that is the nub of this appeal. This section therefore looks at whether, in respect of noise, the mitigation and compensation measures being proposed by HAL can be regarded as 'appropriate'.
974. As the appeal has been made under section 78 of the Town and Country Planning Act 1990 against the LPA's refusal to grant planning permission s.38(6) of the Planning and Compulsory Purchase Act 2004 makes it clear that any determination must be made in accordance with the development plan unless material considerations indicate otherwise. I therefore intend to begin this section by addressing what I see as the most relevant of the development plan policies drawn to the Inquiry's attention together with other current and relevant policy and guidance pertaining to noise. I shall then turn to the generic issues of how residents and communities react to noise before turning to the significance of the scheme specific impacts and the proposed mitigation.

The Policy and Guidance Framework applicable to noise

975. In order to better understand the relationships and interdependencies between the policies and guidance referred to below, each section begins with an outline of when the particular policy/guidance was published.

Development Plan Policies

976. The development plan includes the Hillingdon Local Plan Part 1: Strategic Policies (2012) (LP), the saved policies of the Hillingdon Unitary Development Plan (2007)(UDP)(albeit subsequently adopted as Part 2 of the Local Plan in 2012) and the London Plan (2015 – consolidated with alterations since 2011)(LoP). I consider the most relevant policies in respect of noise to be LP Policies EM8 and T4, UDP Policies A2, OE1 and OE3 and LoP Policies 6.6 and 7.15.
977. LP Policy EM8 seeks to ensure that noise generating development is only permitted if noise impacts can be adequately controlled and mitigated and Policy T4 seeks to support the sustainable operation of Heathrow Airport within its present boundaries whilst improving environmental conditions such as noise. UDP Policy A2 concerns applications for proposals within the boundary of Heathrow Airport which are likely to have a significant adverse environmental impact and seeks sufficient measures to mitigate for or redress the effects of the airport on the local environment. Policies OE1 and OE3 seek, in various ways, to control the noise impacts of development.
978. The Authorities have also drawn my attention to LP Strategic Objectives SO10, which aims to reduce adverse impacts from noise, and SO25 which aims to "maintain support for operational uses within the existing airport boundary that do not increase environmental impacts and continue to reduce existing impacts".
979. Although the Authorities also refer to UDP Policy A1, this concerns proposals which extend Heathrow Airport on land to the north of Bath Road (A4(T)) or otherwise increase the airport runway capacity - and in my view is of limited relevance here. In any event the principles underlying the policy add little to those of the other

policies above - the clear intent of which is to ensure that the noise impacts of development are adequately controlled and mitigated.

980. The most relevant LoP policies are: Policy 6.6 which notes that development proposals affecting aircraft operations or patterns of air traffic should give a high priority to sustainability and should take full account of environmental impacts (including noise), and; Policy 7.15 which amongst other matters seeks for development proposals to manage noise by avoiding significant adverse noise impacts on health and quality of life as a result of new development and by mitigating and minimising the existing and potential adverse impacts of noise resulting from new development - without placing unreasonable restrictions on new development or adding unduly to the costs and administrative burdens on existing businesses.
981. In their closing statement the Authorities also refer to LoP policies 2.6, 3.2 and 5.3. However, whilst these policies are not inconsistent with those above, nor do they add to them in any material way. Indeed, it seems to me that the provision of adequate mitigation (which in this context I see as being synonymous with the term 'appropriate mitigation' as used by the Minister in 2010) would lead to compliance with all the development plan policies identified above. That said, nothing associated with the development plan policies gives any quantitative assistance in determining what might be regarded as 'adequate' or 'appropriate' mitigation - for that it is necessary to turn elsewhere.

The NPPF

982. The NPPF was published in March 2012 and, as a statement of Government policy, is a material consideration of substantial weight in planning decisions. Section 11 (Conserving and enhancing the natural environment) is of particular relevance in respect of noise. Paragraph 109 notes that the planning system should contribute to and enhance the natural and local environment by, amongst other matters, preventing new development from contributing to unacceptable levels of noise pollution.
983. Paragraph 123 notes that planning decisions should aim to:
- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
 - mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions..."

In order to better understand the meaning of 'significant adverse impacts' and 'other adverse impacts' the reader is referred to the Explanatory Note to the Noise Policy Statement for England (NPSE). The note explains that "significant adverse" and "adverse" are concepts derived from toxicology and that LOAEL (Lowest Observed Adverse Effect Level) is the level above which adverse effects on health and quality of life can be detected and that SOAEL is the level above which significant adverse effects on health and quality of life occur.

The NPSE

984. The NPSE was published in 2010. Paragraph 1.5 states that the NPSE should apply to all forms of noise, excepting noise in the workplace, and Paragraph 1.6 makes it clear that the NPSE sets out the long term vision of Government noise policy. That vision is stated as to *"Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development."*
985. Paragraph 1.7 sets out that the long term vision is supported by three noise policy aims which, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development, are to:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life; and
 - where possible, contribute to the improvement of health and quality of life.
986. The Explanatory Note to the NPSE states at 2.23 and 2.24 that the first two aims above mean that, whilst taking into account the guiding principles of sustainable development, significant adverse impacts on health and quality of life (ie those involving noise at levels above SOAEL) should be avoided and, where noise levels lie between LOAEL and SOAEL, all reasonable steps should be taken to mitigate and minimise adverse impacts on health and quality of life – albeit that does not mean that such adverse effects cannot occur. The Authorities consider it important that the SoS should ask the question as to whether HAL has taken all such reasonable steps.
987. Paragraph 2.22 considers that it is not possible to have a single value for SOAEL and that, until further evidence and suitable guidance is available, SOAEL is likely to be different for different noise sources.

The PPG

988. The PPG represents the most up to date Government guidance with the version relied on at the Inquiry in respect of noise being that variously updated on the 6 March 2014 and the 24 December 2014 (INQ/8). It acknowledges that noise can override other planning concerns but points out that both the NPSE and the NPPF do not expect noise to be considered in isolation from the economic, social and other environmental dimensions of the proposed development.
989. Paragraph 003 (Reference ID: 30-003-20140306) notes that local planning authorities' decision taking should take account of the acoustic environment and in doing so consider whether or not a significant adverse effect is occurring or likely to occur; whether or not an adverse effect is occurring or likely to occur; and whether or not a good standard of amenity can be achieved. The paragraph goes on to note that this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

990. Paragraph 005 (Reference ID: 30-005-20140306) explains that below LOAEL, noise will be noticeable but not intrusive, there would be no observed adverse effects and no specific measures would be required. Between LOAEL and SOAEL noise would be noticeable and intrusive, there would be observed adverse effects and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise). (NB. Although the summary table merely describes the action as 'Mitigate and reduce to a minimum' the text is rather more expansive and reflects the policy aims of the NPPF and NPSE by taking into account wider sustainability issues).
991. Above SOAEL, noise would be noticeable and disruptive, would have a significant observed adverse effect and should be avoided. The text makes it clear that if noise is above this level the *"....planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused."*
992. Paragraph 005 also introduces the concept of the Unacceptable Adverse Effect (UAEL) where noise would be noticeable and very disruptive causing extensive and regular changes in behaviour. The text notes that *"At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring."*
993. Paragraph 006 (Reference ID: 30-006-20141224) notes that the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected and will depend on how various factors, such as the level of noise, the time of day at which it occurs, the number of noise events and the frequency and pattern of occurrence. It goes on to note that *"In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur."*
994. Paragraph 008 (Reference ID: 30-008-20140306) notes that the adverse effects of noise can be mitigated by such matters as engineering (reducing the noise generated at source and/or containing the noise generated), layout (including the minimising of noise transmission through the use of screening by natural or purpose built barriers), the use of planning conditions/obligations to restrict activities at certain times and through the use of noise insulation when the impact is on a building.
995. Notwithstanding the expansive nature of the guidance outlined above, nothing in the PPG quantifies LOAEL, SOAEL or UAEL. However, Paragraph 009 (Reference ID: 30-009-20140306) notes that the management of the noise associated with aircraft is considered in the APF.

The APF

996. The APF was published in March 2013. As an up-to-date statement of Government aviation policy setting out the Government's objectives and principles to guide plans

and decisions at local and regional level it is a material consideration of very substantial weight.

997. Chapter 3 deals with noise and other local environmental impacts, the Government recognising that noise is the primary concern of local communities near airports. Paragraph 3.9 notes that the Government has powers under the Civil Aviation Act 1982 to set noise controls at specific airports which it designates for noise management purposes. Heathrow is one such airport and Paragraph 3.10 notes that, as it is one of the airports that remains strategically important to the UK economy, it is considered *"....appropriate for the Government to take decisions on the right balance between noise controls and economic benefits, reconciling the local and national strategic interests"*. At a more general level, Paragraph 3.12 notes that the Government's overall policy on aviation noise is to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise - with Paragraph 3.13 noting that this is consistent with the Government's noise policy set out in the NPSE.
998. Beyond those general aims there are a number of more detailed statements in later APF paragraphs that I consider to be of immediate and particular relevance in helping to clarify the Government's position on the matters at issue in this case. These are:

Paragraph 3.14: *"Although there is some evidence that people's sensitivity to aircraft noise appears to have increased in recent years, there are still large uncertainties around the precise change in relationship between annoyance and the exposure to aircraft noise."*

Paragraph 3.15: *"To provide historic continuity, the Government will continue to ensure that noise exposure maps are produced for the noise-designated airports on an annual basis providing results down to a level of 57dBLAeq 16hr"*.

Paragraph 3.17: *"We will continue to treat the 57dBLAeq 16hr contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance. However, this does not mean that all people within this contour will experience significant adverse effects from aircraft noise. Nor does it mean that no-one outside of this contour will consider themselves annoyed by aircraft noise."*

Paragraph 3.18: *"The Airports Commission has also recognised that there is no firm consensus on the way to measure the noise impacts of aviation and has stated that this is an issue on which it will carry out further detailed work and public engagement. We will keep our policy under review in the light of any new emerging evidence."*

Paragraph 3.19: *"Average noise exposure contours are a well established measure of annoyance and are important to show historic trends in total noise around airports. However, the Government recognises that people do not experience noise in an averaged manner and that the value of the LAeq indicator does not necessarily reflect all aspects of the perception of aircraft noise. For this reason we recommend that average noise contours should not be the only measure used when airports seek to explain how locations under flight paths are affected by aircraft noise."*

999. A later section of Chapter 3 is headed 'Measures to reduce and mitigate noise – the role of industry'. It is again worth reproducing some paragraphs here:

Paragraph 3.24: *"The acceptability of any growth in aviation depends to a large extent on the industry tackling its noise impact. The Government accepts, however, that it is neither reasonable nor realistic for such actions to impose unlimited costs on industry. Instead, efforts should be proportionate to the extent of the noise problem and numbers of people affected."*

Paragraph 3.28: *"The Government expects airports to make particular efforts to mitigate noise where changes are planned which will adversely impact the noise environment. This would be particularly relevant in the case of proposals for new airport capacity, changes to operational procedures or where an increase in movements is expected which will have a noticeable impact on local communities. In these cases, it would be appropriate to consider new and innovative approaches such as noise envelopes or provision of respite for communities already affected."*

1000. Paragraphs 3.36 – 3.41 form a section headed 'Noise insulation and compensation'. The paragraphs of most relevance are:

Paragraph 3.36: *"The Government continues to expect airport operators to offer households exposed to levels of noise of 69 dB LAeq,16h or more, assistance with the costs of moving."*

Paragraph 3.37: *"The Government also expects airport operators to offer acoustic insulation to noise-sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63 dB LAeq,16h or more. Where acoustic insulation cannot provide an appropriate or cost-effective solution, alternative mitigation measures should be offered."*

Paragraph 3.39: *"Where airport operators are considering developments which result in an increase in noise, they should review their compensation schemes to ensure that they offer appropriate compensation to those potentially affected. As a minimum, the Government would expect airport operators to offer financial assistance towards acoustic insulation to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to levels of noise of 63 dB LAeq,16h or more."* The Authorities point out that the draft APF contained no corresponding paragraph and that HAL has been unable to identify any formal review as having taken place. [236, 238]

Paragraph 3.40: *"Any potential proposals for new nationally significant airport development projects following any Government decision on future recommendation(s) from the Airports Commission would need to consider tailored compensation schemes where appropriate, which would be subject to separate consultation."*

Other plans

1001. The London Borough of Hounslow Unitary Development Plan (2003) (HoUDP) is also a material consideration of appreciable weight. HoUDP Policy ENV-P.1.5 notes that *"the Council will not allow any development proposals which could result in unacceptable levels of noise nuisance to nearby existing or future occupiers"*.

1002. The emerging Hounslow Local Plan is a further material consideration that should be accorded moderate weight. Emerging Policy EQ5 deals with noise and states that *"we will seek to reduce the impact of noise from aviation.....and require the design of new development to have considered the impact of noise, and mitigation of these impacts, on new users and surrounding uses according to their sensitivity"*. This will in part be achieved by *".....working with Heathrow Airport to improve conditions for households and other noise sensitive uses exposed to high levels of noise consistent with the Aviation Policy Framework....."*. Development proposals will be expected to, inter alia, *"Ensure that noise mitigation measures are implemented, to demonstrate compliance with British Standard BS8233:2014 – Guidance on sound insulation and noise reduction for buildings, as appropriate"* – with the Authorities arguing that the reference to BS8233:2014 is not limited to new build homes.
1003. The notes to emerging Policy EQ5 state amongst other matters that *"Between the 69dBA LAeq and 63dBA LAeq contours there will be a presumption against family housing, whilst other smaller one bed and studio housing will only be accepted where high levels of sound insulation and ventilation are provided"* and *"In addition, between 63 and 57DBA LAeq contours all new built development, including residential extensions, should have high levels of sound attenuation and acoustically treated ventilation."* It is later stated that *".....the borough considers that the 69dB(A) LAeq 16hr contour represents a Significant Observed Adverse Effect Level (SOAEL). As such residential developments within this area are not permitted."*
1004. Emerging Policy EC3 deals specifically with Heathrow Airport and seeks to encourage a more sustainable Heathrow Airport by working with the airport operator and other partners to reduce environmental impacts whilst recognising the airport's role in the local economy. Development proposals will be expected to demonstrate that air and noise pollution from aircraft movements avoid adverse impacts on the borough and will be expected to assess and illustrate the noise impacts of any development proposal, including the use of alternative noise metrics (ie alternative in addition to dB LAeq 16hr).

The Policy and Guidance Framework applicable to noise - conclusions

1005. To my mind the provision of adequate/appropriate mitigation and compensation (which of course first involves the adequate assessment of any effects) would lead to compliance with all the development plan policies identified above. It would also lead to compliance with the Government's overall aims on noise as expressed through the NPPF, NPSE and APF as well as the guidance in the PPG insofar as 'appropriate' may be taken to include 'proportionate'. The question nonetheless remains as to how to establish what might be regarded as adequate/appropriate mitigation.
1006. Notwithstanding the Authorities' submissions to the effect that the APF was accorded more prominence and weight by HAL's witnesses than should have been the case, the APF offers perhaps the most detailed guidance on how to assess whether any mitigation might be deemed adequate and appropriate. However, whilst the APF states that the Government will continue to treat the 57dBLAeq 16hr contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance, the Authorities believe that the onset of community annoyance begins at a lower level of around 55dB Lden (equivalent at Heathrow to around 53/54 dBLAeq 16hr).

1007. The Authorities also contend that whilst the APF expects airport operators to offer financial assistance towards acoustic insulation to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to noise levels of 63db LAeq 16hr or more, evidence has shown people to be more sensitive than the APF assumes, especially at the higher noise levels.
1008. Indeed, the Authorities point out that the APF itself recognises that there is some evidence that people's sensitivity to aircraft noise appears to have increased in recent years. I am also conscious that the PPG, the most recent of Government guidance, notes that where noise levels are already high, even a small increase in the overall noise level may result in a significant adverse effect occurring. It is therefore to matters of sensitivity and the significance of changes that I turn next.

Sensitivity to aircraft noise

1009. The APF notes that there is some evidence that people's sensitivity to aircraft noise appears to have increased in recent years. However, it also notes that there are still large uncertainties around the precise change in the relationship between annoyance and the exposure to aircraft noise - and continues to rely on 57dBLAeq 16hr contour as marking the approximate onset of significant community annoyance. The Authorities however suggest that the onset of community annoyance begins at a lower level and consider that there has been substantial evidence of a shift in tolerance or sensitivity to aircraft noise since the Air Noise Index Study (ANIS) was carried out in the early 1980s - ANIS being the basis for the APF's reliance on the 57dBLAeq 16hr contour as representing the approximate onset of significant community annoyance.
1010. That said, the APF was published in 2013 and was drafted in light of not only ANIS (published in 1985) but also the study into Attitudes to Noise from Aviation Sources in England (ANASE)(published in 2007) - ANASE being a study commissioned in 2002 by the DfT in part to re-assess attitudes to aircraft noise in England and their correlation with the Leq noise index. The aim of ANASE was to allow the Government to review national policy on noise from aircraft on a robust evidential basis.
1011. The Authorities point out that the ANASE study found that average annoyance was greater than in the previous ANIS survey and that in consequence two opposing hypotheses can be inferred. Firstly, that either LAeq is the appropriate measure and more people are now annoyed by a given sound level than was the case in the early 1980s or, secondly, that LAeq is not the appropriate measure and annoyance would better correlate with another measure of aircraft noise such as one based on the sound level of the aircraft and the number of movements.
1012. It is clear that the authors of the APF were aware of the findings of the ANASE study in that the draft APF⁹⁴⁶ notes that the Government acknowledges that research in recent years suggests that the balance of probability is that people are now relatively more sensitive to aircraft noise than in the past - that research including both the ANASE report and the EEA Technical Report No 11/2010 from the European Environment Agency. The APF nonetheless continued to treat the

⁹⁴⁶ CD/01/31 p53 footnote 94

57dBLAeq 16hr contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance.

1013. The Authorities suggest that this was in part consequent on criticisms of the ANASE work by a non stated preference peer review group who took issue with several aspects of the ANASE work - including such matters as the design of the questionnaire, the use of loudspeakers during the interviews and the use of noise monitoring equipment for calibrating aircraft noise calculation models in the areas where the interviews were taking place. The Authorities point out that those criticisms have since been addressed in a report published in September 2013⁹⁴⁷ - after the publication of the APF (March 2013).
1014. The later report, unlike the original government-commissioned ANASE report, was commissioned by the London Borough of Hillingdon on behalf of the '2M group' of local authorities around Heathrow airport. It was nonetheless written by the authors of the original ANASE study. It suggests that the findings of the ANASE study are "more robust than the previous ANIS study", are "more up-to-date", are "consistent with non survey-based sources of reported community annoyance" and are "consistent with the current known situation across Europe".
1015. The Authorities regard that later report (and the ANASE study itself, even if only the restricted data is used) as support for the view that sensitivity to aviation noise has increased - and in consequence consider that the probable modern equivalent for the approximate threshold for the onset of significant community annoyance is around 53 to 54dB LAeq 16hr rather than 57dB. In further support of their view the Authorities have also drawn my attention to a range of other matters - including the National Noise Attitude Survey report (NNAS)(2014), the 2010 study "Trends in aircraft noise annoyance: the role of study and sample characteristics"⁹⁴⁸ as well as HAL's reliance on the 55 Lden metric at other times and in other situations. [271-284]
1016. Considering each of those matters in turn, as far as the NNAS is concerned, it was published by Defra in December 2014 and post-dated the APF [280-285]. According to the Authorities the NNAS demonstrates a strongly significant increase in people's annoyance response to aircraft noise (despite no material increase in the proportion of people hearing noise) - which the Authorities suggest clearly indicates that there will be greater numbers of people more annoyed by aircraft noise at lower levels now than there would have been 30 years ago when the 57dB LAeq,16 hour level was set. HAL, however, takes the view that the NNAS is not comparable to either ANASE or ANIS in that it did not consider dose responses; considered the population as a whole; and, considered all forms of environmental noise rather than just aircraft noise.
1017. HAL also suggests that changes to the survey composition when compared to the previous NNAS may in any event have materially affected the answers given to the relevant questions. As such HAL considers that the NNAS falls well short of being a major change in the evidence supporting the APF policy and does not, with regard to Paragraph 5.4 of the APF, support a policy review and refresh. I agree with HAL's reasoning.

⁹⁴⁷ CD/02/14

⁹⁴⁸ INQ/14

1018. As far as the study into "Trends in aircraft noise annoyance: the role of study and sample characteristics" (2010) is concerned, the Authorities note that it concludes that *"A significant increase over the years was observed in expected annoyance at a given level of aircraft noise exposure"*. However, I am conscious that the concluding section also goes on to note that a limitation of meta-regression analysis is that some of the characteristics which differ between studies can be highly correlated - making it difficult to differentiate between their effects such that caution should be taken in the interpretation of the effects. That said, as the Authorities also point out, the conclusion states that *"Despite the uncertainties with regard to its explanation, it is clear from the observed trend that the applicability of the current exposure-annoyance relationship for aircraft noise... should be questioned."*
1019. With regard to HAL's use of 55Lden/53dB LAeq, 16 hour level as the threshold for significant community annoyance effects, the Authorities point to its use at the ES scoping stage - where it was said to be consistent with the mapping requirements arising from EU Directive 2002/49/EC and the preferred measure used by the European Union. In that regard the Authorities note that CAP1165 states that *"the standard European measure is the 55 dBA Lden noise contour.... Throughout this document we take the 57 dBA LAeq, 16 hour contour, as the UK's current accepted representation of the onset of significant annoyance, to allow comparison on a like-for-like basis. However... there are a variety of competing and complementary metrics available to represent aviation noise and use of 57dBA LAeq, 16 hour should not be interpreted as a belief that is the sole effective measurement."*
1020. The Authorities also note that the use of the 55Lden level was judged to be relevant and important in the Health and Equality Impact Assessment; that HAL's Noise Action Plan (NAP) uses the 55 Lden contour as well as the 57dBA LAeq, 16 hour contour, and; that HAL has also offered a new noise insulation scheme based on the 55Lden noise contour in the context of the third runway (R3) proposal.
1021. Against this background it seems to me that, notwithstanding that the Government's endorsement of the APF is fairly recent, there must be some serious question marks over the continuing reliance on 57dBA LAeq, 16 hour as the approximate onset of significant community annoyance.
1022. HAL, however, points out that it is not the role of a s78 appeal to review whether or not Government policy is appropriate. That of course is true. Indeed, as a statement of current Government policy the APF must also attract considerable weight. Nevertheless I accept that there could be other factors of even greater weight. The question, in the context of this s78 appeal, is therefore whether or not any of the other matters before the Inquiry should be accorded more weight than the APF - and, as the Authorities point out, whilst the APF continues to treat the 57dBLAeq 16hr contour as the average level of daytime aircraft noise marking the approximate onset of significant community annoyance that does not preclude operators from offering insulation and compensation at lower levels than those indicated in the APF.
1023. Another way to consider the issue is whether or not compliance with the Government's expectations on insulation and compensation as set out in the APF would be sufficient to also ensure compliance with the development plan. In order to help answer that question it is first necessary to determine whether the other considerations raised by the Authorities are of sufficient weight to conclude that

55Lden should be preferred to 57dB LAeq 16hr as the approximate onset of significant community annoyance in the determination of this appeal.

1024. In that regard I agree with HAL that the decision to retain the use of 57dB LAeq 16hr in the APF as a measure marking the onset of significant community annoyance would not have been taken lightly or in ignorance of the controversy surrounding that approach [528, 529]. I also agree with HAL that it would be inappropriate to continuously revisit that policy decision from first principles on a case by case basis. To my mind any new evidence coming to light would therefore need to be very substantive and weighty if it is to demonstrate that a decision should be made otherwise than in accord with the APF.
1025. I have already noted that the ANASE study would have been a consideration in formulating the APF. Whilst the response of the report's authors to the criticisms raised by the peer review group followed publication of the APF and does therefore represent a new matter to be taken into account, on the basis of the information before the Inquiry I see no reason to prefer the authors' response over that of the peer review. Indeed, the fact that it was carried out by the authors of the original report means that it could be seen as having less independence than the peer review. As such I consider that the response to the criticisms of the ANASE report can attract little weight.
1026. As far as the NNAS is concerned I accept HAL's criticisms of its shortcomings in the context of this appeal and therefore accord it no more than limited weight. The study on "Trends in aircraft noise annoyance: the role of study and sample characteristics" should also be accorded very limited weight in that it seems to me to do little more than raise a question mark over the applicability of the current exposure-annoyance relationship. It was in any event published before the APF and would therefore have been available to those drafting the APF.
1027. Turning to the use of the 55 dBA Lden contour, although the Authorities refer to the fact that CAP 1165 (2014) recognises that Lden is the standard European measure and that 57dBA LAeq, 16 hour should not be interpreted as a belief that it is the sole effective measurement, CAP 1165 also notes that *"The adoption of Leq as the UK Aircraft Noise Index followed extensive surveying of attitudes to aircraft noise and resulted in a dose-response relationship linking levels of community annoyance to Leq"*⁹⁴⁹. Although it is recognised that the dose response relationship underpinning the use of 57dBA LAeq, 16 hour dates from 1982 and *".....that some stakeholders consider the relationship to be no longer valid"*, CAP 1165 also states that *"We believe that any noise metric and levels used for policy assessment should be evidence based and support the need for a new aviation noise attitude survey"*.
1028. For the reasons above I do not consider that the NNAS can be seen as representing such a survey and in any event, none of the expressed reservations in CAP 1165 go so far as to prevent it from taking *".....the 57 dBA LAeq, 16 hour contour, as the UK's current accepted representation of the onset of significant annoyance."* In consequence I see CAP 1165 as offering little support to the use of 55Lden here.
1029. With regard to HAL's reference to 55Lden at the time of the ES Scoping Report, the Authorities' view is that it is 'entirely apparent' from the scoping report and the

⁹⁴⁹ CD/02/12 p20

correspondence that followed⁹⁵⁰ that what HAL had decided to do was use a lower threshold as the marker for the onset of significant community annoyance than that found in then extant Government policy. For its part HAL maintains that the provision of data in the ES using Lden was in order to allow an assessment to be made using that metric in the event that the decision maker found it useful or helpful. However, whilst that may be so, it does not seem to me to be a complete explanation of the way that HAL treated the use of 55 dBA Lden in the Scoping Report and subsequent correspondence.

1030. In particular, having noted in the ES Scoping Report that the number of people exposed to various Lden contours (as well as the 90SEL contour and various Night contours) would be reported, the Scoping Report then states that *"Additionally, the corresponding populations within the standard LAeq 16h.....contours will also be reported"*. That clearly suggests to me that use of the Lden metric was being accorded at least a degree of primacy over the use of other metrics. I am also conscious that HAL's letter to LBH of the 4 December 2012 notes under the heading of 'Significance Criteria (Noise)' that *".....for residential receptors and the assessment of air noise, effects will be considered 'negative significant' where noise increases by either $\geq 3\text{dB}$ for residential receptors exposed to either $\geq 54\text{ LAeq } 16\text{hr}$ or $\geq 55\text{ Lden}$ "*. To my mind those matters are a clear indication that, at the time, HAL placed appreciably greater significance on the use of the 55 Lden metric than is now the case in this appeal.
1031. Insofar as the use of 55Lden in the NAP is concerned, HAL notes that its use is a legal requirement. As such it seems to me of little significance in understanding HAL's views on the appropriate level for the onset of community annoyance - albeit it does add some further general credence to the use of 55Lden.
1032. What is perhaps more significant is that HAL should have proposed the use of 55Lden as the basis of its mitigation offer in the event that the third runway (R3) is to proceed. HAL suggests it is simply a matter of responding to the APF's statement that *"Any potential proposals for new nationally significant airport development projects following any Government decision on future recommendation(s) from the Airports Commission would need to consider tailored compensation schemes where appropriate....."* and points out that as the appeal proposals are of a different scale, magnitude and purpose to R3 a different approach should be applied to mitigation. However, whilst any R3 project may bring significant commercial benefits to the airport and thus be more able to 'afford' a higher level of mitigation, I see no difference between being exposed to a certain level of noise through the appeal proposal or through the R3 project. I am also conscious that whilst HAL has argued that any mitigation should be 'proportionate' [560-562], it has not argued that there are any specific financial constraints on the provision of mitigation or compensation here - nor has it put forward any viability evidence seeking to justify any lesser provision of mitigation in this case.
1033. Against this background it seems clear to me that HAL has, in other places and at other times, placed appreciable reliance on the use of 55Lden as the basis on which to propose mitigation. However, I note that both the ES Scoping Report (June 2011) and the letter of 4 December 2012 both preceded the publication of the APF -

⁹⁵⁰ HAL/RTT/A/02 Appendix 7: London Borough of Hounslow [sic] Response

and would therefore have been put together at a time when Government was refreshing its policy on aviation noise. HAL has also explained that the potential reliance on 55Lden in respect of R3 is because HAL considers it would be a 'new nationally significant airport development project'. Consequently HAL may simply have been seeking to follow, or anticipate any changes in, Government policy - rather than itself considering that the threshold for the onset of significant community annoyance should be set at a lower level.

1034. Whatever the underlying explanation the mere fact that HAL has, on occasion, placed reliance on 55Lden as influencing the onset of community annoyance must lend some weight to the Authorities' view that 55den should be preferred to 57dB LAeq 16hr. However, as HAL may simply have been seeking to follow what it saw as, or anticipated would be, Government policy I do not see it should be accorded any significant weight.

Sensitivity to aircraft noise - summary

1035. I accept that a number of the matters raised by the Authorities raise questions over the appropriateness of continuing to use the 57dB LAeq 16hr contour as representing the onset of significant community annoyance. However, for the reasons above, I do not consider that any of those matters are of sufficient weight, even collectively, to mean that any considerations should be based on a different level to that which represents current Government policy as outlined in the APF. Accordingly, whilst recognising that people will be annoyed at levels below 57dB LAeq 16hr I nonetheless consider that it should continue to be treated as representing the onset of significant community annoyance.
1036. That has a number of implications. Firstly, as it is the point marking the onset of significant community annoyance it also seems the appropriate level to consider as LOAEL (in that it is likely to be the point at which the acoustic character of the area is affected to the extent that there is a perceived change in the quality of life) rather than the 54dB LAeq16hr or 55dB Lden suggested by the Authorities. Secondly, it reinforces the use of the LAeq 16hr metric as the primary metric to be used in the assessment of aircraft noise.

Significance of Effects

1037. For individuals and communities the significance of changes to the noise environment is influenced by various factors including not only changes in absolute noise levels but also by such matters as changes in the spectral characteristics of the noise and the duration of individual noise events. However, based on the evidence before the Inquiry it seems to me that the most significant factors, and thus the key influences on the need for and the type of mitigation, are the quantum of any change and the resultant absolute noise level.
1038. At low noise levels there may be no need to mitigate even a noticeable change in noise level if the resultant level is also low - and even at high noise levels there may still be no need for mitigation if the change in noise levels is small. That might occur in this case if, say, the number of over-flights increased by only a small amount. Even though there would be a change in absolute noise level, it may well pass unnoticed by the majority of people - particularly over a long period of time. In contrast, mitigation may well be needed if the resultant noise level was to be

high and the change was large enough to be noticeable. That might occur if, say, the number of flights was to be doubled (equivalent to around a 3dB increase).

1039. Indeed, the Authorities suggest that the relationship between the absolute noise level and the change experienced is intertwined such that the quantum of change needed for an effect to be seen as significant varies according to the absolute noise level being experienced.
1040. However, before I come on to the significance of absolute levels, change and their relationship I shall first address the way in which the term 'significant adverse effects' as used in the ES relates to HAL's proposed mitigation in the form of insulation and compensation.
1041. The ES treats effects on the residential population as 'significant adverse' if the increase in noise level is equal to or exceeds 3dB and LAeq 16hr is at least 57dB (see Table 6.26) - the Scoping Report noting that a 3dB change has been widely used in ESs as the point at which a change in the noise environment becomes significant as a change of this magnitude is most likely to alter a person's annoyance response.
1042. However, as may be seen from section 6.14, the ES does not consider that all of those significant adverse effects warrant mitigation in the form of insulation or compensation. Although the mitigation proposals outlined in the ES are subject to a considerable number of errata (eg even in the erratum notes to the ES (January 2014)⁹⁵¹ the summary of the proposed mitigation in Paragraph 6.14.8 and the figures in Table 6.31 do not tie up with Table 6.13), it is nonetheless apparent that the mitigation proposals outlined in the ES never set out to address all of what the ES itself labelled as 'significant adverse' effects.
1043. Even though the currently proposed mitigation package has evolved from that suggested in the ES (eg the mitigation now being proposed for schools has been altered such that eligibility is now dependent only on the school being within the 63dB LAeq contour rather than also requiring a 3dB increase) the Authorities note that there will be many people defined in the ES as suffering significant adverse effects who would receive no insulation or compensation.
1044. That is clearly true irrespective of the Authorities' view that the onset of significant community annoyance should in any event be set at a lower level than 57dB LAeq 16hr. It is therefore necessary to determine whether or not that is a reasonable approach; in that light I shall turn first to look at the matter of the absolute noise level and its effect on the need for mitigation.

Absolute level

1045. The PPG is clear that between LOAEL and SOAEL consideration needs to be given to mitigating and minimising the effects of noise. Insofar as the appropriate levels for LOAEL and SOAEL are concerned I am conscious that CAP1165 notes that "*In transitioning from NNI[Noise and Number Index] to Leq, it was logical and convenient todefine three levels of Leq corresponding [to] low, moderate and high annoyance, which were subsequently defined as 57, 63 and 69dBA LAeq.*" That approach seems to be reflected in the APF in that 57dB LAeq is taken as the

⁹⁵¹ CD/01/02A

onset of significant community annoyance; 63dBALAeq is the level at which the Government expects airport operators to offer acoustic insulation to noise sensitive buildings, and; 69dBALAeq is the level at which the APF expects airport operators to offer households assistance with the costs of moving. The SOUG note that the main parties agree that 63dB LAeq 16hr should be regarded as SOAEL; in light of the approach taken in the APF and CAP1165 I see no reason to disagree.

1046. As far as LOAEL is concerned, although the Authorities believe that LOAEL should be set at around 54dB LAeq 16hr, HAL considers it unnecessary to identify a level for LOAEL. However, as noted previously it is my view that the point marking the onset of significant community annoyance should also be regarded as LOAEL. In consequence I consider that 'consideration needs to be given to mitigating and minimising the effects of noise' between 57 and 63dB LAeq 16hr, albeit that the NPSE notes that the guiding principles of sustainable development should be taken into account. The NPSE also notes that taking all reasonable steps to mitigate and minimise adverse impacts on health and quality of life does not mean that such adverse effects cannot occur. The Authorities consider it important that the SoS asks the question as to whether HAL has taken all such reasonable steps in its proposals.
1047. In addition to their differences as to the value of LOAEL, the parties also differ as to whether or not insulation should be provided below SOAEL⁹⁵².
1048. In the Authorities' view, the guidance in the PPG is clear that insulation is appropriate at levels below SOAEL [367]. However, the PPG does not seem to me to be in any way prescriptive; what it says is that between LOAEL and SOAEL, noise "*.....starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)*" – before later referring to 'four broad types' of mitigation, only one of which involves insulation.
1049. HAL's contrasting view is that mitigation between LOAEL and SOAEL is provided in this case by a variety of largely operational measures including restrictions on aircraft noise emissions, NPRs, the '1000ft rule' etc⁹⁵³. HAL also argues that whilst adverse effects between LOAEL and SOAEL must be "*mitigate[d] and minimise[d]*"⁹⁵⁴ the Examining Authority's Report and the Secretaries of States' decision on the Thames Tideway Tunnel (TTT) Development Consent Order application confirms that the aims of the NPSE are satisfied by the provision of acoustic insulation at the level of SOAEL (whatever that is determined to be in the particular case), and by other mitigation measures below that level.
1050. HAL considers that its proposed approach reflects the principles established in the TTT case [500] whereas the Authorities view the TTT development and its circumstances as completely different to those pertaining here - such that there are no general principles that can be transferred. In particular, the Authorities consider that there is nothing to the effect that insulation is limited to the level of SOAEL and above and nothing to say that noise effects below SOAEL need not, or cannot, be mitigated by insulation measures. [248–258]

⁹⁵² See INQ/56A and INQ56B (HAL and Authorities SOUG)

⁹⁵³ INQ56/A HAL SOUG on Noise

⁹⁵⁴ CD/02/03, para. 2.24.

1051. On that, I agree with the Authorities. Although the decision of the Secretaries of State notes⁹⁵⁵ that off-site mitigation is part of the means available to an Applicant to manage noise impacts, my attention was not drawn to anything in the decision that convinces me that SOAEL should be treated as some kind of 'cut off' as far as insulation is concerned.
1052. That said, HAL also points out [565] that the Government's own policy in the APF anticipates that there will be circumstances where communities are exposed to significant increases in noise between 57dBA and 63dBA LAeq 16hr - but where no financial assistance towards acoustic insulation need be offered. Given that the APF's approach is to treat 57dB LAeq 16hr as the average onset of significant community annoyance yet it also outlines that, as a minimum, the Government expects airport operators to offer financial assistance towards acoustic insulation to residential properties which experience an increase in noise of 3dB or more which leaves them exposed to levels of noise of 63dB or more, that must be true. Consequently whilst I do not see SOAEL as a 'cut off' for acoustic insulation nor do I see any policy imperative for the provision of insulation below SOAEL.
1053. As far as UAEL is concerned, this is the point at which noise would be noticeable and very disruptive causing extensive and regular changes in behaviour. The parties both put this at 69dBLAeq 16hr in their SOUG and, as the point at which the APF requires the provision of relocation assistance, I see no reason to take a different view.

Change in noise level

1054. With regard to the significance of a change in noise level, the Authorities suggest that the ES reliance on a +3dB change in judging significance is out of kilter with current views and that there is no justification in the APF, or any other policy, for imposing a +3dB change criterion irrespective of noise level [313–315]. The Authorities instead suggest that a 3dB change should be adopted up to a guideline level of 63dB (SOAEL) and 1dB above that. For its part, HAL argues that use of a 3dB change is common practice, aligns with the APF and is robust in statistical terms such that a change in the noise environment is in fact referable back to the development. [549–551]
1055. In support of their case that a 1dB change should be used to denote significance above a guideline level of 63dB the Authorities have referred to the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014) as well as the PPG [320–324]. The Authorities have also referred to the "...up to date dose response of the EEA report...."⁹⁵⁶ as showing that the change in percentage annoyed for any particular increase in noise becomes greater as the overall noise levels increase.
1056. The IEMA guidelines themselves were not put before the Inquiry. Although the Authorities suggest by reference to a figure extracted from the IEMA Guidelines⁹⁵⁷ that noise changes at or above a 'guideline' have more impact than the same

⁹⁵⁵ CD/01/35 para 70

⁹⁵⁶ HIL/DF/P/2 Mr Fiumicelli PoE p57 Figure 5.2

⁹⁵⁷ HIL/DF/P/2 Mr Fiumicelli PoE p59 Figure 5.3

changes below that guideline I am not convinced by either the figure or the oral evidence at the Inquiry that it is necessarily so.

1057. I accept that there is some evidence that the dose/response relationship is dependent on the absolute noise level - as illustrated by the changing gradient of the figure and borne out by the change in percentages of those highly annoyed between various noise levels as shown in the table from the EEA report. However, both the IEMA figure and the table from the EEA report seem to suggest that there is little difference in the dose/response relationship at the extremes. Whilst I accept that the IEMA figure does indicate a change in response around the guideline value, the figures given in the table suggest that the most significant disparity is when comparing figures around the guideline value to low levels of noise. Indeed, whilst the Authorities suggest that with reference to the EEA report that the ES *"...fails to recognise that the change in percentage annoyed for any particular increase in noise becomes greater as the overall noise levels increase..."* the table actually shows that the increase in percentage terms of those highly annoyed for a 3dBA increase in Lden is 8% between 57 Lden and 69Lden – falling to 6% at 72Lden.
1058. Although the Authorities also refer to the guidance in the PPG that, "in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small impact in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur", nothing was drawn to my attention that would help to quantify what might be meant by 'high noise levels' or a 'small impact'. Consequently it seems to me that whilst the PPG alerts the decision maker to the possibility that significant adverse effects may occur at high noise levels with little or no change in behaviour I do not see this as offering any significant support to the Authorities' position that the appropriate significance criterion above 63dB should be a change of 1dB.
1059. However, whilst I am not convinced by the Authorities' arguments that a 1dB change should be the criterion for assessing significance above 63dB LAeq 16hr, nor am I convinced by HAL's reliance on the statistical significance of a 3dB change. Given that 3dB represents a doubling of noise (which may be translated here as a doubling of the number of over-flights) it seems to me highly likely that increases of somewhat less than 3dB would be noticed, even over time. Although HAL argues [551] that if two different noise environments differ by 1dB on the LAeq16hr index there is a 20% probability that a social survey would show no change in annoyance between those environments that suggests to me that there is actually a high probability that such a survey would show some change in annoyance. As far as HAL's argument that 3dB as a criterion of significance is, in effect, in 'common usage' little in the way of support for that argument was put before the Inquiry.
1060. In summary I find that none of the arguments above should be accorded any significant weight; in contrast, as current Government policy, the approach in the APF should be accorded substantial weight. Although the Authorities maintain that there is no justification in the APF for a 3dB change irrespective of the noise level the fact is that the only change criterion specified in the APF in respect of noise insulation and compensation is 3dB – and then only when leaving a residential property exposed to levels of noise of 63dB or more.

1061. In that respect it is of note that the APF only seeks to apply the change criterion to residential properties; the Government expects operators to offer acoustic insulation to noise sensitive buildings such as schools and hospitals solely on the basis that they are exposed to levels of 63dB LAeq 16hr or more. That is a clear distinction in the APF and confirms that the Government's expectation for residential properties is that acoustic insulation should be linked to both an appreciable change in the noise environment as well as an absolute noise level.
1062. Although nothing before the Inquiry fully explains the reasoning behind the differing approach to insulation in schools and residential properties, I note that the findings of the 'Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health' study (RANCH) reveal that high levels of chronic aircraft noise exposure impair children's reading and their ability to perform complex cognitive tasks. That seems to me indicative of a strong correlation between absolute levels of noise and learning - as opposed to the annoyance suffered by residents which appears to also depend on the ability to perceive a change. However, it is in any event the case that whilst HAL originally considered mitigation for schools by reference to a 3dB change, it no longer adopts that approach in its proffered mitigation - relying instead solely on the 63dB LAeq 16hr contour.

Significance of Effects – summary

1063. Against the background above I consider that 57, 63 and 69 dB LAeq 16hr should, in this case, be regarded respectively as LOAEL, SOAEL and UAEL. In terms of the significance of any change in noise levels, and notwithstanding the various arguments put forward by the Authorities as to the increasing sensitivity of residents at higher noise levels, I find no good reason to depart from the 3dB criterion identified in the ES - which I consider also gains considerable support from current Government policy in the APF.
1064. As far as the TTT decision is concerned, although I do not see it as establishing SOAEL as a 'cut off' point for acoustic insulation, nor do I see any policy imperative for the provision of insulation below that level - and I accept that noise mitigation and minimisation may be achieved in other ways below SOAEL. In consequence, the fact that not all residents identified in the ES as suffering significant adverse effects would necessarily receive acoustic insulation or compensation does not seem to me an unreasonable approach. In consequence, I do not equate the 'significant adverse effects' identified in the ES with those that the NPSE seeks to avoid.

Alternative metrics

1065. The Authorities have referred in their SOUG to a large number of alternative metrics. However, the Authorities' view as to what metrics might be appropriate in order to properly inform any necessary mitigation appears to have evolved considerably over the course of the appeal [567-571] and the basis of the mitigation proposed in the SOUG for residential properties is somewhat different to that initially put before the Inquiry. In any event there is little to be gained from exploring any metrics except where they influence the currently proposed mitigation. In that regard, although the Authorities' mitigation proposals at the Inquiry referenced the LAeq 8hr metric⁹⁵⁸, the Authorities' SOUG addresses the

⁹⁵⁸ HIL/DF/P/2 Fiumicelli PoE Paras 7.1.17 – 7.1.19

mitigation for residential properties by reference to the LAeq 16hr metric. In consequence I see no reason to address further the use of the LAeq 8hr metric in the context of residential properties.

1066. As far as schools are concerned, the Authorities have been consistent in the SOUG and the Inquiry in referring to the LAeq 8hr and LAeq 30 min - as well as some measure of individual noise events such as L_{Amax} fast (the maximum A-weighted level with the sound meter set on FAST response).
1067. HAL raises a number of criticisms of the Authorities' reliance on the LAeq 8hr metric - pointing out amongst other matters that not only does the APF rely on the LAeq 16hr metric but also that the RANCH study is based on the LAeq 16hr metric [586]. HAL also criticises the Authorities' view that the LAeq 8 hr metric better reflects the school day - pointing out that the 8hr contours relied on by the Authorities only includes periods of over-flight and leaves out of account completely those days when a given school is not being over-flown at all.
1068. However, whilst HAL is technically correct on the latter point it does not seem to me to get to the heart of the matter. If, for example, there are two schools within the same noise contour but one is only over-flown for half the time, that school will experience twice as many flights during the period when it is over-flown. Whilst it would clearly benefit from respite at the times when it is not being over-flown, teaching may be severely disrupted at other times. In contrast, although the school being continuously over-flown would not benefit from respite, teaching may nevertheless be able to take place at all times without experiencing any severe disruption.
1069. That said, I agree with HAL [542] that there are considerable difficulties in employing an LAeq 8hr metric here given the lack of relevant dose-response relationships before the Inquiry. In consequence, and whilst I acknowledge the shortcomings of using averaging metrics with a time period which is poorly related to the activity affected, I consider that any mitigation should be by reference to the LAeq 16hr metric.
1070. Although the Authorities also refer to the use of L_{Amax} fast and LAeq 30 min as alternative metrics I note that these were used in the ES in assessing the significance of effects on educational establishments⁹⁵⁹, albeit that the Authorities consider that there were flaws in the approach adopted [349-351].

Mitigation

1071. Against the background above I now turn to assess whether the mitigation proffered by HAL can be regarded as 'appropriate'. As part of that assessment I set out in broad terms below what that mitigation offer is in terms of both residential properties and community facilities (the detail of the proposed mitigation is contained in the two Unilateral Undertakings (INQ62/A and INQ62/B)) before commenting as to its appropriateness.
1072. In overall terms, HAL maintains that as the proposal creates no additional capacity and only concerns a change to its existing operational procedures for relatively small periods of time, there is no obvious justification for doing anything in the way

⁹⁵⁹ Eg CD/01/02A Para 6.7.43

of mitigation other than applying Government policy as laid out in the APF. In addition, HAL maintains that to offer mitigation to those affected by the ending of the Cranford Agreement that would be markedly different to that offered to other properties around the airport experiencing similar levels of noise would result in artificial boundaries of eligibility - and itself create inequity. HAL's mitigation offer in terms of insulation and compensation therefore largely follows what is set out in the APF at Paragraphs 3.36, 3.37 and 3.39 - albeit with a few exceptions.

Residential properties – noise levels between 57 and 63dBLAeq 16hrs (LOAEL-SOAEL)

1073. HAL notes in the SOUG that between LOAEL and SOAEL a full range of regulatory controls and noise minimisation measures have been put in place by the Secretary of State and the CAA in accordance with the legislation and guidance for regulated airports. These include measures such as restrictions on aircraft noise emissions, Noise Preferential Routes, Westerly Preference, the 1000ft Rule, Continuous Decent Approaches, Airport Noise Monitoring, Noise Limits and Fines and the Noise Action Plan. HAL also notes that with specific reference to the appeal proposals, runway alternation during easterlies will provide respite for communities during easterly operations as well as westerly operations.
1074. Notwithstanding the list put forward by HAL the Authorities suggest that in reality no mitigation at all is proposed by HAL between LOAEL and SOAEL which is scheme specific and which addresses the noise impacts arising from the development. In the Authorities' view that is contrary to the statutory development plan, contrary to the NPSE, contrary to the NPPF and contrary to the PPG.
1075. I accept the Authorities' point that none of the measures, even runway alternation, are 'scheme specific' - in the sense that they were designed specifically to mitigate the noise arising from the development. Indeed, it seems to me that all of these measures merely reflect the airport's normal operational practices. However, it is also the case that in their absence, local residents would experience higher levels of noise and thus they can, in PPG terms, be regarded as mitigating the noise impact by 'engineering' and even perhaps by 'layout' in the case of, say, the NPRs. Insofar as alternation is concerned, although it would not actually reduce the overall noise levels experienced, and indeed would at times concentrate that noise, it would also allow periods of respite. These are generally recognised as providing a benefit.
1076. HAL ALis not, however, proposing any form of acoustic insulation to properties between LOAEL and SOAEL. The Authorities clearly find that unpalatable and have suggested an extensive range of mitigations between LOAEL and SOAEL (indeed, some are also proposed at LOAEL) based on a sliding scale.
1077. Noise between LOAEL and SOAEL will, by definition, be noticeable and intrusive and there will be a change in the acoustic character of the area such that there will also be a perceived change in the quality of life. The ES also identifies that an appreciable number of residents will experience 'significant adverse effects' without any form of insulation or compensation being available to them. However, although the NPSE has a policy aim to avoid significant adverse effects, as explained above I do not consider that the significant adverse effects identified in the ES directly equate to the aim expressed in the NPSE. That said, the NPSE also notes that all reasonable steps should be taken to mitigate and minimise adverse impacts on

health and quality of life – albeit taking into account the guiding principles of sustainable development and recognising that such adverse effects may occur.

1078. With respect to the principles of sustainable development the Authorities point out that no viability information was put before the Inquiry and HAL has never sought to rely on viability as a reason to justify inadequate mitigation [307]. However, whilst HAL has not sought to argue 'affordability' as a criterion for insulation it has referred to 'proportionality'. That does not seem to me to be an unreasonable stance to take in a situation in which, although it seems likely that there would be some operational benefit – and thus commercial gain to the airport – in ending the Cranford Agreement, the Government's stated aim in ending that agreement was simply to redistribute noise more fairly around the airport.
1079. In that the social and environmental aspects of sustainability appear to have been the drivers behind the decision to end the Cranford Agreement I agree with HAL that "....it would be disproportionate and unreasonable to require HAL to make substantial changes to its overall approach to the offer of insulation for those affected by noise from the airport, as the price for obtaining the planning permission needed to implement full runway alternation on easterlies". In broad terms I also agree with HAL that, in those circumstances, there is no obvious justification for doing anything other than applying the Government's policy in the APF [562].
1080. The Government's expectations outlined in the APF do not expressly seek insulation for residential properties below 63dB LAeq 16hr and in light of all the matters above it is my view that the question as to 'whether HAL has taken all such reasonable steps in its proposals to mitigate and minimise adverse impacts on health and quality of life?' can be answered in the affirmative. In consequence, and despite the Authorities' concerns as to what it sees as the absence of any 'specific mitigation' below SOAEL, I see no conflict in this regard with the development plan, the PPG, the NPPF, the NPSE or the APF.

Residential properties – noise levels between 63 and 69dBLAeq 16hrs (SOAEL-UAEL)

1081. HAL's offer of noise insulation between SOAEL and UAEL applies to those residential properties which, after scheduled easterly alternation has commenced, would experience an increase in noise of 3dB or more which results in exposure to external aircraft noise levels of 63dBLAeq 16hrs or more ('Type B' properties). HAL's offer is to meet the full cost of any Noise Insulation Measures identified following a survey by a Noise Assessor – defined as an independent noise and ventilation systems assessor with not less than 10 years' relevant qualifications and expertise appointed by HAL at its own cost.
1082. The Authorities suggest that HAL's scheme specific mitigation does not begin at the agreed SOAEL level of 63dB LAeq, 16h but begins when a property is not only within the 63dB LAeq, 16h contour, but also experiences a 3dB change [365]. Whilst the way in which it is expressed by the Authorities could perhaps be more accurately characterised as "....when a property is not only within the 63dB LAeq, 16h contour, but *has also experienced at least a 3dB change*" (in other words a property currently at 60dB LAeq 16hr experiencing a 3dB increase would be included in the proposed insulation scheme) there is no doubting that the combined eligibility criteria mean that is that only a small area is covered.

1083. Although HAL suggests [483] that the number of properties qualifying for insulation would be around 350 (with 175 qualifying for relocation assistance) the Authorities suggest that, actually, only some 175 properties would qualify for the noise insulation scheme (with some 350 qualifying for relocation assistance). Inspection of figure B attached to the June 2015 technical note produced after the adjournment by HAL "Noise Contours and Insulation Schemes"⁹⁶⁰, as well as the diagrams attached to the Unilateral Undertakings⁹⁶¹, suggests that it is the Authorities who are correct. Whilst the error is likely to have arisen from the incorrect tabulations in the ES, it does not actually alter the fact that the proposed insulation measures reflect the criteria outlined in the APF or that the undertakings are intended to secure those measures.
1084. Although the Authorities consider that properties experiencing a 1dB change resulting in a noise level above 63dBLAeq 16hr should be eligible for acoustic insulation and ventilation, for the reasons given earlier I do not see that as appropriate or necessary.
1085. In that HAL's offer is to meet the full cost of any Noise Insulation Measures identified following a survey by a Noise Assessor, HAL considers that its insulation offer exceeds the minimum expected in the APF which is only to 'offer financial assistance towards acoustic insulation'. The Authorities however maintain that the aim should be to meet the standards set out in BS8233:2014 in order to provide a satisfactory internal noise environment [366]. Whilst I acknowledge the Authorities' view that the reference to BS8233:2014 is not limited to new build homes, I note that BS8233 "... does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building" [574]. I am also conscious that any survey would not only be carried out by an independent noise and ventilation systems assessor but that wherever any surveys are carried out in order to establish the necessary works, the Unilateral Undertakings include a provision for dispute resolution.
1086. I am also conscious that, despite HAL's statement that its offer is to meet the full cost of any Noise Insulation Measures identified following a survey by a Noise Assessor, the Undertakings make clear that there are certain limitations on both the scope and cost of the noise insulation that may be provided. These include such matters as limiting the works to loft insulation, ceiling over-boarding (to a maximum cost of £2100 per habitable room), double or secondary glazing, insulation to external doors and such ventilation systems as may be reasonably required to ensure comfortable living conditions in habitable rooms. I do not, however, consider the proposed restrictions unreasonable.
1087. Against this background I consider that the proffered mitigation between SOAEL and UAEL is consistent with the APF and would be sufficient to avoid significant observed adverse effects.

Residential properties – noise levels exceeding 69dBLAeq 16hrs (UAEL)

1088. In terms of assistance with moving, HAL's offer to those properties which would experience external aircraft noise levels of 69dBLAeq 16hrs or more after scheduled

⁹⁶⁰ INQ/49

⁹⁶¹ INQ62A and 62B

easterly alternation has commenced (referred to in the submitted Undertakings as 'Type A' properties) is a payment of up to £12,500 based on a lump sum of £5,000 plus 1.5% of the sale price up to a maximum of £7,500. The Authorities however criticise the relocation package pointing out amongst other matters that it has been unchanged since 2005 and offers no understanding of the actual costs of moving such as estate agency fees, surveying fees, legal fees, mortgage fees and the practical costs of moving such as fitting out a new property [373-375].

1089. HAL points out that the scheme is the same as that in the NAP (approved and adopted by the SoST in 2014) and that the average payment made under the existing scheme has been less than the cap [589-592]. However, the fact that the average payment has been less than the cap seems to me to offer little support to HAL's case that the offer is reasonable. (The average will be less than the cap even if only one property was to come in below the maximum figure). However, despite the Authorities suggesting that reference to the NAP being approved by the Secretary of State does not assist HAL - as the details of the financial assistance are not set out in the NAP - it seems to me unlikely that the SoS would have failed to take account of such a measure in approving the NAP.
1090. In any event, whilst I generally accept the Authorities' point that the proposed relocation package lacks any obvious linkage to the real costs of moving and is now some 10 years old I am also conscious that the Government's expectation in the APF is that airport operators should offer households assistance with the costs of moving – not that operators should bear the whole cost. In that light it seems to me that the relocation package can be considered appropriate.
1091. That said, it is clear from the documentation submitted after the adjournment (in response to my queries raised at the Inquiry⁹⁶²) that there will be properties newly coming within the 69dB LAeq, 16 hour contour that will be eligible for the relocation scheme but that will not be eligible for the proposed insulation scheme - which is in part reliant on a 3dB increase being experienced.
1092. PPG Paragraph notes that above UAEL noise would be noticeable and very disruptive causing extensive and regular changes in behaviour. Those properties coming within the 69dB LAeq, 16 hour contour will, by definition, suffer unacceptable adverse effects - and the PPG is clear that unacceptable adverse effects should be prevented.
1093. Notwithstanding that relocation assistance would be available to those properties there are likely to be households who, for perfectly valid reasons, do not want or are unable to relocate. In consequence it seems to me that an insulation scheme should also be made available to those households who would otherwise be entitled to relocation assistance. I am conscious that the PPG notes that "*At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise.*" However, whilst it may not be possible to fully mitigate the effects of noise the adverse effects could clearly be reduced. The implications otherwise are that the development should not proceed.
1094. Although INQ/49 suggests that those eligible for relocation assistance are eligible for noise insulation under either HAL's existing or Cranford-specific insulation

⁹⁶² INQ/49

schemes, inspection of Figure B attached to INQ/49 suggests that there are few, if any, residential properties that would be entitled to the Cranford-specific insulation scheme. Whilst HAL's existing residential 'Day Insulation Scheme Boundary' (based on 1994 69dB LA eq 18hr) would appear to encompass all the properties newly coming within the 'Relocation Assistance' 69dB LAeq, 16 hour contour, HAL's evidence to the Inquiry was that uptake of the existing scheme is low – a situation reflected in CAP1165. Whilst the existing scheme includes the provision of free secondary glazing (or half price double glazing) to external windows and doors, and loft insulation, HAL recognises that the current scheme's restriction to half-price double glazing may have limited the extent of take up [576-578].

1095. In consequence it is my view that the proposed mitigation above a noise level of 69dB LAeq 16hrs should only be regarded as appropriate if the Cranford-specific insulation scheme is made available to the affected households. This might be achieved by the imposition of an appropriate condition on any permission.

Residential properties – other matters

1096. HAL is also offering to fund Noise Vibration Measures, if recommended by a Noise Assessor, up to a maximum of £10,000 per property for those residential dwellings located in the Noise Vibration Assessment Area ('Type C' properties) that include a Noise Sensitive Structure (a lightweight structure physically attached to the property and used as a habitable room). Type C properties are those residential dwellings located in the 'Noise Vibration Assessment Area' defined by Figure 3 attached to INQ62/A - in essence covering the village of Longford. As a reaction to potential problems I consider this an appropriate response which goes beyond the minimum expected by the APF.
1097. As far as night time noise is concerned, the Authorities point out that a 3dB change criterion is applied in the ES to the night time noise threshold for significance (55dB L_{night}) in order to assess whether or not an effect is significant. In the Authorities' view, whilst the threshold is appropriate, the addition of the change criterion is not supported by the WHO Night Noise Guidelines and is not required from an effect perspective - the Authorities arguing that the autonomous nature of the reaction means that it is inappropriate to require a qualifying change and that mitigation should depend solely on the absolute level [313].
1098. The ES identifies that some 500 dwellings would be newly exposed to noise levels in excess of 55dB L_{night}⁹⁶³. However, it also identifies that, using the 3dB change criterion, no dwellings would experience significant adverse effects in terms of L_{night} where L_{night} is at least 45dB. The ES also points out that there are no scheduled departures during the night period at Heathrow. Whilst I note that some 3050 dwellings would see an increase in L_{night} noise levels⁹⁶⁴ I also note HAL's suggestion that a noise insulation threshold of 63 dB LAeq 16h may broadly achieve mitigation at 55 dB L_{night} - albeit, as the Authorities note, no evidence has been submitted to prove this [368].
1099. In any event, and notwithstanding the Authorities' concerns, in reality there was little substantive evidence put before the Inquiry in support of the Authorities'

⁹⁶³ CD/01/02A Table 6.17

⁹⁶⁴ Ibid Para 6.8.50 and Table 6.18

position (or indeed HAL's position) on the matter of night noise - or the need for insulation. In particular, although the Authorities' SOUG refers to Lnight and LAmax as appropriate metrics in terms of sleep disturbance, they are not thereafter referenced in terms of mitigation and I am conscious that HAL has an existing residential noise mitigation scheme for night noise (said to be based on the 2004-5 B744RR 95th percentile 90dB(A) SEL footprint) that encompasses significant areas to the east and west of both runways⁹⁶⁵.

1100. In light of the matters above, and particularly the fact that the Authorities have put forward little substantive evidence in support of the need for additional night noise insulation beyond that already available, I do not see a need to take this matter further.

Schools – noise levels exceeding 63dBLAeq 16hrs

1101. With regard to schools, HAL is offering insulation and ventilation to those schools falling within the 63dBLAeq 16hrs contour. In addition, whilst it is outside the 63dBLAeq 16hrs contour, HAL is offering insulation and ventilation measures to Cedars, a special school which would experience a large increase in noise. The insulation offer is mostly based on previously undertaken survey work up to an overall maximum figure of some £2.24m (known as the School Insulation Contribution). Those 'School Ventilation and/or Overheating Avoidance Measures' considered appropriate following surveys to be carried out by a School Insulation Assessor (utilising an independent noise and ventilation systems assessor) would also be funded - with no limit on the amount of provision. Littlebrook Nursery School in Longford will be offered similar mitigation measures to the other schools but is yet to have any form of survey.
1102. Wherever surveys are to be carried out to inform the works deemed necessary the Unilateral Undertakings include provision for dispute resolution. HAL notes that the internal noise environment in all the schools receiving insulation is expected to be better than at present, even with the implementation of full easterly alternation.
1103. Notwithstanding the proposals above the Authorities consider that the appropriate aim of any noise mitigation in schools should be to achieve, or at least minimise the breach of, the standards laid out in Building Bulletin 93 Acoustic design of schools: performance standards (BB93). In that respect the Authorities note that not only did the ES based its significance criteria on BB93 standards but that the early acoustic consultancy reports compared the internal noise environment post insulation with the then extant BB93. On that basis the Authorities suggest that the proper inference is that HAL accepts and acknowledges that the BB93 standards are relevant and should be applied.
1104. The Authorities' SOUG contains the detail of the mitigation it considers appropriate; in essence the Authorities consider that schools should be identified by reference to the LAeq 8hr metric with mitigation packages being developed on a case by case basis using criteria from BB93 - such that all harm caused by the development is mitigated and compensated.

⁹⁶⁵ INQ/49 Figure A

1105. In addition, the Authorities note that there are a number of schools identified in the ES as suffering significant adverse effects but which will receive no compensation. In the Authorities' view, a further 8 schools in Hounslow should be considered for mitigation. They also raise particular concerns over Cranford Primary School estimating that it will experience noise levels from departing aircraft of up to around 94 dB LAmax fast and question whether the school can continue as an educational establishment and whether Heathrow should instead fully fund a new school in a different location.
1106. The Government's expectation, expressed through the APF, is that airport operators should offer acoustic insulation to noise-sensitive buildings, such as schools and hospitals, exposed to levels of noise of 63dB LAeq 16hr or more. The Government also expects that where acoustic insulation cannot provide an appropriate or cost effective solution, alternative mitigation measures should be offered. I consider that HAL's proposed mitigation meets those expectations. Indeed, in offering to provide acoustic insulation to one school falling outside of the 63dBA contour the offer exceeds Government's expectations. Although the Authorities believe that insulation should be offered to a further 8 schools, none of those schools fall within the 63dB LAeq 16hr contour.⁹⁶⁶
1107. As noted above, in terms of the insulation to be provided, that has been identified through surveying of the schools and the proposed works are detailed in the Unilateral Undertakings - except in respect of Littlebrook Nursery. Although the Authorities consider that the need for any works should be linked in some way to BB93 ('achieve or minimise the breach of'), I accept HAL's view that there is a limit to what can be achieved in existing buildings. As BB93 is designed to apply to new build schools, conversions and refurbishment work - not the installation of noise mitigation measures in existing schools - I also agree with HAL that seeking to achieve BB93 standards in this situation would be inappropriate.
1108. Whilst I acknowledge that is not the Authorities' case that BB93 standards should be achieved but should merely form a 'stretch target', it is unclear as to how that might work in practice - in that it would still require a judgement to be made as to what is appropriate. In any event, HAL points out that the existing noise levels in the affected schools are already in excess of those set out in BB93 - but that once the proposed insulation measures are implemented those internal noise levels are in fact expected to be less than they are today. I agree with HAL that to mitigate to levels considerably below those already experienced, and thus considerably beyond the impacts of the Appeal Proposals, would be to place an unreasonable requirement on HAL. Indeed I also accept that creating a better noise environment in those schools should be seen as a benefit of the proposals - albeit that there will of course also be a considerable number of unmitigated adverse effects in other schools.
1109. Insofar as the Authorities' reference to the LAeq 8hr metric is concerned I have already established why I do not consider it an appropriate metric to be used here.
1110. In respect of Cranford Primary School, and in particular the fear that it may not be able to continue operating as an educational establishment, the Authorities' position

⁹⁶⁶ See INQ26 and accompanying drawings

appears to derive from the Committee Report to Hillingdon Council⁹⁶⁷. However, there was otherwise little in the way of cogent evidence drawn to my attention to support those concerns and I am conscious that the proposed mitigation measures are expected to deliver a 4dB improvement⁹⁶⁸. I am also conscious that HAL's expectation is that once the proposed insulation measures are implemented the internal noise levels will be less than today, and that overflying is in any event likely to occur for only around 12% of the time. In consequence, and whilst I acknowledge the Authorities' concerns, I do not consider the evidence before me sufficient to warrant any special provisions in regard to Cranford Primary School.

1111. Against this background I consider that HAL's proposed mitigation in regard to schools can be regarded as appropriate.

Community buildings and outdoor areas

1112. For community facilities, the Authorities consider that the five healthcare facilities which have been identified⁹⁶⁹ as likely to be significantly adversely affected should be offered mitigation [402]. HAL, however, points out that all fall outside the 57dB contour [581] and in those circumstances I agree with HAL that insulation is not required.
1113. For outdoor community areas, and starting at areas within the 54dB LAeq, 16 hour contour (LOAEL), the Authorities believe that HAL should be required to reconsider their position and offer mitigation to address the effect on such areas, as a necessary part of mitigating the impacts of the scheme. The suggested mitigations are summarised within the Authorities' SOUG and include such matters as 'Winter Gardens' and community access via public transport to alternative, quieter facilities [403]. However, as HAL points out [818] there was little before the Inquiry to support the Authorities' suggestions and nothing to show how any such obligations would work or satisfy the requirements of the NPPF. I have not pursued them further.

Noise Barrier

1114. Although some people believe the barrier would be an 'eyesore', others consider it should be even higher than the proposed 5m. In its current form and position the forecast effect of the noise barrier is to reduce noise levels at receptors in Longford by approximately 3dBA, up to 5dBA, compared to what they would be without the barrier in place. The exact effect would of course be dependent on the location of the receptors and source of the noise but its main benefit would be in reducing ground noise. The ground noise assessment in the ES includes the noise barrier and thus the identified effects are residual.
1115. Although the Authorities considered that further work should be undertaken on the barrier's height and location to see if a more effective placement could be achieved, no such alternatives were before the Inquiry. For its part, HAL maintains that the proposed position and height of the barrier are optimal. I am in any event conscious from my site visit that there are a number of significant physical constraints on the location of any barrier.

⁹⁶⁷ See also HIL/DF/P/2 paras 7.1.25 – 7.1.27

⁹⁶⁸ INQ 62B p28 Schedule 2 Part B

⁹⁶⁹ CD01/02 p95 para 6.8.60

1116. In all the circumstances I consider the noise barrier to be an appropriate part of the overall mitigation package. Whilst Green Belt matters and character and appearance are considered elsewhere, I note that the Authorities accept that if the Appeal Proposals were to go ahead, the Noise Barrier "*is the best solution to mitigate*" [598].

Living Conditions (Noise) – Conclusions

1117. The implementation of full easterly alternation will clearly affect the noise environment experienced by many residents living around the airport as well as the users of various institutions, particularly a number of the local schools. Whilst the effects do not appear materially different to those predicted at the time the decision was taken to end the Cranford Agreement it is nonetheless clear that, *in terms of the significance criteria outlined in the ES* (my emphasis), no residents will experience a significant beneficial effect whilst some 1700 dwellings (or around 4,450 people) will suffer significant adverse effects. Of those 1700 dwellings, only some 175 would qualify for insulation on the basis of the proposed mitigation scheme with some 350 eligible for home relocation assistance. In consequence some 1175 dwellings would experience what *are defined by the ES* as significant adverse effects without any offer of insulation or relocation assistance.
1118. It is nonetheless true to say that ES Table 6.12 shows that around 36,100 people will experience beneficial effects compared to only around 18,550 suffering adverse effects. Although almost 34,000 of those people experiencing beneficial effects would only see a reduction of between 1 and 2dB in the LAeq16hr levels – which in practice may or may not be noticeable – there would clearly be a rebalancing of the noise effects around the airport and for some people, the respite newly experienced on easterly operations would no doubt be a welcome benefit. In terms of overall effects, ES Table 6.16 states that the implementation of full easterly alternation would lead to around 100 fewer people being 'annoyed' and 50 fewer being 'highly annoyed'. Whilst I acknowledge the Authorities' scepticism of those figures, the Authorities in reality produced little in the way of a substantive challenge to their credibility. In any event, it seems to me that they do not go to the heart of the Inquiry which is whether or not the proposed mitigation is appropriate.
1119. The Authorities point out that compliance with the development plan is dependent on both the adequate assessment of any effects and the adequate mitigation of those effects. My finding in respect of the assessment of effects has some parallels with the issues identified by the Inspector in the T5 report⁹⁷⁰ (November 2000) – in that I consider that the use of the LAeq 16hr metric and the reliance on 57dB LAeq 16hr as marking the onset of community annoyance both have considerable shortcomings. However, whilst I acknowledge the Authorities' concerns that averaging metrics fail to give adequate weight to the number of aircraft movements and to individual noise events, I consider that for the reasons above, LAeq 16hr remains the most appropriate metric to be used in assessment and mitigation terms.
1120. The Authorities have also argued that in a number of respects the APF fails to reflect recent evidence concerning the noise dose-response relationship such that compliance with the APF is not in fact sufficient to ensure compliance with the

⁹⁷⁰ CD/04/03 p354

development plan. In support of that contention the Authorities point amongst other matters to the references in the ES to significance criteria based on the Lden metric as well as HAL's use of the Lden metric in other circumstances. However, whilst I accept that there must be question marks over the continued reliance on the 57dB LAeq 16hr as the basis for the onset of community annoyance, none of the matters relied on by the Authorities are of sufficient weight to convince me that any determination should be made other than in accordance with the APF.

1121. With respect to the proposed mitigation I am content that it accords with the minimum expectations of the Government as outlined in the APF. Indeed, on balance I am also content that in a number of respects it exceeds those minimum expectations. Although the Authorities have referred to the fact that HAL does not appear to have complied with the APF by undertaking a review of its compensation scheme I do not see the APF as necessarily requiring a formal review and consultation. To my mind HAL's approach has led to a sufficient review of its compensation schemes, albeit not formally designated as such.
1122. In light of the matters above it is my view that the proposed noise mitigation measures would, if supplemented by the provision of the 'Cranford –specific' insulation scheme to those would be eligible for relocation assistance (properly secured through a condition or obligation) be in accordance with the APF. The measures would be proportionate, particular to the development, adequate and appropriate and as such I consider that they would ensure compliance with the development plan, the NPPF, the NPSE and the PPG. They would also satisfy the requirements placed on the airport operator by the Government in its decision to end the Cranford Agreement.

LIVING CONDITIONS (AIR QUALITY)

Introduction

1123. The main parties agree in the AQ SOCG that the focus of the appeal in respect of air quality is solely on the annual mean concentrations of nitrogen dioxide (NO₂) during operation of the proposed development [612]. I have no reason to take a different view.
1124. The development would not itself result in an increase in the number of flights, nor would it result in any significant increase in emissions - albeit that overall emissions of NO_x are modelled to increase by some 12.1 tonnes (or 0.2%) over the baseline in 2017 (and around 10.8 tonnes (again 0.2%) in 2020) as a result of changes to such matters as taxiing, take-off roll and hold patterns.⁹⁷¹ However the development would clearly produce changes in the spatial distribution of emissions around the airport. The main effects are anticipated to be the increased aircraft contribution to NO_x in the Longford area to the northwest of the airport (that will in turn increase concentrations of NO₂) and a reduction in NO₂ concentrations in Stanwell at the western end of the southern runway.
1125. The LPA's Committee report⁹⁷² notes that the airport is located in the Air Quality Management Area (AQMA), said by the LPA to have been declared for exceedances

⁹⁷¹ CD/03/04 4.2.3

⁹⁷² CD/01/03 p91-95

NOT PROTECTIVELY MARKED

APPENDIX 21C WHITEARCH RESIDENTIAL PARK TARGETED CONSULTATION INFORMATION

NOT PROTECTIVELY MARKED

11 May 2021

Dear Resident,

The Sizewell C Project, PINS Reference Number EN010012
Targeted consultation on rail noise impacts between 12 May and 11 June 2021 (inclusive)

On 27 May 2020, NNB Generation Company (SZC) Limited ('**SZC Co.**') made an application to the Planning Inspectorate under the Planning Act 2008 for a Development Consent Order for the Sizewell C Project ('**Application**'). The Application was accepted for examination by the Planning Inspectorate on 24 June 2020 (Application Reference: EN010012). An Examining Authority was appointed on 30 June 2020 to examine the Application. The examination commenced on 14 April 2021 and is due to be completed by 14 October 2021.

As part of the Application, an Environmental Statement (Examination Library refs. APP-159 to APP-582) was submitted to the Planning Inspectorate in May 2020, which included an assessment of rail noise arising from the transport of construction materials by train on the East Suffolk Line. An Environmental Statement Addendum (Examination Library refs. AS-179 to AS-260) was subsequently submitted in January 2021, which included an updated assessment of rail noise. These documents, together with all of the other Application documents, are available for inspection free of charge on the webpage relating to the Application on the Planning Inspectorate's website under the 'Documents' tab: <https://infrastructure.planninginspectorate.gov.uk/projects/eastern/the-sizewell-c-project/?ipcsection=docs>

The rail noise assessment in the May 2020 Environmental Statement explained, at paragraph 1.6.6 of Volume 9, Appendix 4B (Examination Library ref. APP-546), that:

"In reviewing the potential noise levels we have undertaken research to identify the number of properties which may be impacted: estimated numbers of properties affected are as shown in Table 1.9 below. These numbers will continue to be reviewed including, where relevant, permanent residential caravans and houseboats identified."

As committed to in the May 2020 Environmental Statement, we have continued to review the likely rail noise impacts of the Sizewell C Project. In particular, we have undertaken a more detailed assessment of the impact of rail noise on park homes at Whitearch Park, Benhall. SZC Co. has prepared the enclosed document, entitled 'Sizewell C Noise Assessment and Mitigation Plan - Park Homes' and an associated summary document, to explain the results of this assessment and to identify the mitigation measures that are proposed in respect of the likely impacts that have been identified.

We are writing to you to offer you the opportunity to submit to SZC Co. any comments that you may have on the Application including the further rail noise assessment that we have undertaken and the proposed mitigation measures that we have identified. Please label any responses as "Targeted consultation on rail noise impacts/mitigation" and ensure that they are submitted to SZC Co. by **Friday 11 June 2021** via one of the following methods:

- Email comments to info@sizewellc.co.uk
- Post comments to FREEPOST SZC CONSULTATION (no stamp or further address required)
- If you are shielding and unable to use the above methods, call Freephone 0800 197 6102 (09:00 – 17:00 Monday to Friday) to arrange for your response to be collected

SZC Co. will have regard to any consultation responses received. We will also provide any responses to the Examining Authority (at Deadline 3) who are conducting the examination to inform their consideration of the Application. The Examining Authority may publish these responses at: <https://infrastructure.planninginspectorate.gov.uk/projects/eastern/the-sizewell-c-project/>

If you would like to know more about the development consent process, including the examination stage, a step by step guide has been produced by the Planning Inspectorate, entitled Advice Note Eight: Overview of the nationally significant infrastructure planning process for members of the public and others. This can be found at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

Details of how the Application will be examined and a copy of the examination timetable can be found in the Rule 8 letter published on 21 April 2021, which is available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-003597-Rule%208%20Letter%20and%20Annexes.pdf>

Yours sincerely,

Carly Vince

Chief Planning Officer

Enc. Sizewell C Noise Assessment and Mitigation Plan – Park Homes

Sizewell C Noise Assessment and Mitigation Plan – Park Homes - Summary Document



Sizewell C targeted consultation:

Rail noise at Whitearch Park, Benhall

Proposals for Sizewell C, a new nuclear power station on the Suffolk coast, and associated development, are currently being examined by the Planning Inspectorate, the agency that deals with national infrastructure planning.

This follows our (NNB Generation Company (SZC) Limited) May 2020 submission of an application for development consent for the project, which included an assessment of potential noise effects of Sizewell C freight trains running on the East Suffolk line.

Since submission of the application, we have carried out additional work to further consider potential effects on homes at Whitearch Park, Benhall.

This document outlines the findings of the additional work, while a detailed report of the assessment can be found in the Sizewell C Noise Assessment and Mitigation Plan – Whitearch Park.

We are now seeking feedback on the additional assessment work in this targeted consultation which closes on Friday 11 June 2021.

If you have any comments you can send responses by email to info@sizewellc.co.uk, or by post to **FREEPOST SZC CONSULTATION** (no stamp or further address required).

If you are unable to use email or post, please call **0800 197 6102** (9am – 5pm, Monday to Friday) to arrange for your response to be collected.

Construction transport: rail

We are proposing to use road, rail and sea-based transport to move materials for the construction of Sizewell C. At the peak of construction, our rail proposals provide for up to four trains a day (eight movements, of which we expect seven to be at night), operating five and sometimes six days a week.

Trains would travel from the south along the East Suffolk line, joining the refurbished Saxmundham to Leiston branch line, and unloading at a temporary facility on land east of Eastlands Industrial Estate.

We are also proposing to build a temporary rail extension (the 'green rail route') from just west of Leiston to a new unloading terminal on the northern side of the Sizewell C site.

This will be in use within two years of the start of the project, running up to four trains a day. While the green rail route is being built, a maximum of two trains a day (four movements, we expect three of which will be at night) will run along the refurbished Saxmundham to Leiston branch line.

Our rail proposals also include a commitment to mitigation through the:

1. **Noise Mitigation Scheme**, providing improved sound insulation for properties meeting qualifying criteria; and
2. **Rail Noise Mitigation Strategy**, which includes measures to reduce train noise by, for example, improving trackbeds and rails for smoother running, upgrading signalling, limiting night speeds to 10mph at some locations, and using quieter locomotives.

The details of these proposals can be found in the Planning Inspectorate's Examination Library as documents [APP-210] and [AS-258].

If you have difficulties accessing these documents online, please contact us by email, post, or phone (0800 197 6102 open 9am – 5pm, Monday to Friday) and we will provide you with hard copies.

Additional assessment

Our additional assessment of rail noise focuses on potential airborne noise at certain locations affected by Sizewell C construction trains, including Whitearch Park.

It considers maximum noise levels at night, which earlier assessments revealed as having the most impact due to the increase from the current limited number of night-time rail movements.

Assessments were carried out in line with government policy, which sets tests for noise based on the lowest observed adverse effect on health and quality of life (LOAEL) and significant observed adverse effects on health and quality of life (SOAEL).

For night-time (11pm to 7am) railway noise, the LOAEL is considered to be 60dB L_{AFmax} and the SOAEL is considered to be 77dB L_{AFmax} . Policy requires levels between the LOAEL and SOAEL to be mitigated and reduced to a minimum, while levels above the SOAEL should be avoided.

Rail noise at Whitearch Park

The homes at Whitearch Park are too far from the railway line to be significantly affected by ground-borne noise or vibration from construction trains.

Similarly, while Network Rail may do work to improve some sections of the East Suffolk line, it would be considered routine maintenance rather than substantive construction works, so we have not considered construction noise or vibration here.

Our additional assessment of airborne rail noise effects on park homes at Whitearch Park, Benhall, shows:

- two homes could be exposed to L_{AFmax} noise levels of between 70dB and 77dB;
- one home is predicted to be exposed L_{AFmax} noise levels of more than 77dB; and
- the remaining homes are predicted to be subject to L_{AFmax} noise levels of less than 70dB.

The three homes can be seen in or touching the red and blue shaded areas in Figure 1.

For all homes at Whitearch Park except one, the noise level is either below the LOAEL or between the LOAEL and the SOAEL. In the latter case, we are required to mitigate and reduce noise to a minimum.

For the home exposed to higher noise levels, which is shown just touching the blue shaded area in Figure 1, the requirement is to avoid the effect. As the homes at Whitearch Park are modern and newly built, we consider the improvements in sound insulation offered by the Noise Mitigation Scheme will successfully avoid the SOAEL for the one home predicted to have higher noise levels.

It will also mitigate and minimise the internal sound levels in the other two homes predicted to be exposed to noise levels of more than 70dB.

Figure 1










Additional potential mitigation measures

While the Noise Mitigation Scheme and Rail Noise Mitigation Strategy will reduce noise to the required levels at Whitearch Park, it has also been shown that an acoustic barrier or noise screen between the railway line and the park homes would reduce noise levels at Whitearch Park so that none of the homes would be exposed to $L_{A_{Fmax}}$ noise levels of 70dB or more.

We are proposing to amend the Noise Mitigation Scheme as the Examination progresses to allow for the potential construction of an acoustic barrier, however it would require further discussion with the owner and residents of Whitearch Park, plus assessment of potential environmental effects and planning permission from the local authorities before being built. This process would be separate to the planning process for Sizewell C.

CONTACT

 **FREEPHONE 0800 197 6102***  **info@sizewellc.co.uk**
 **www.sizewellc.co.uk**  **Sizewell C Information Office,**
 **@sizewellc** **48-50 High Street, Leiston IP16 4EW****

*Calls to 0800 numbers are free from UK landlines. Call costs from mobile and international numbers may vary.

**By appointment between 10am and 4pm Monday to Friday.





The Sizewell C Project

Noise Assessment and Mitigation Plan - Whitearch Park

Revision: 1.0
Applicable Regulation: Regulation 5(2)(q)
PINS Reference Number: EN010012

May 2021

Planning Act 2008
Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009



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1 INTRODUCTION

1.1 Overview

1.1.1 NNB Generation Company (SZC) Limited ('SZC Co.') has made an application to the Planning Inspectorate under the Planning Act 2008 for a Development Consent Order (DCO) for the Sizewell C Project. The application is currently the subject of an examination by the Planning Inspectorate (application reference EN010012).

1.1.2 As part of the application, an Environmental Statement was submitted to the Planning Inspectorate in May 2020, which included an assessment of rail noise arising from the transport of construction materials by train on the East Suffolk line. An Environmental Statement Addendum was subsequently submitted in January 2021, which included an updated assessment of rail noise.

1.1.3 This document provides a more detailed assessment of potential noise effects from the use of the rail infrastructure on park homes located at Whitearch Park, south of Saxmundham. This more detailed assessment has been undertaken as envisaged in **paragraph 1.6.6 of Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)].

1.1.4 Sections 1, 2 and 3 set out relevant background information, to provide context for the noise assessment which is set out in section 4.

1.2 Proposed Development

1.2.1 To facilitate the construction of SZC, a combination of transportation modes is proposed to deliver construction materials to the site. The proposed transportation modes are road, rail and sea-based.

1.2.2 This supplemental assessment focuses on the potential for airborne noise effects from rail movements, as the locations considered will be most-affected by that particular mode of transportation.

1.2.3 The **Freight Management Strategy** (Doc Ref 8.18) [[AS-280](#)] for the project provides for up to four trains per day at the peak of construction, equating to eight train movements per day. Of these eight train movements per day, it is envisaged that seven movements will occur at night, as there is insufficient rail capacity during the daytime. The possibility of a fifth train each day has been investigated with Network Rail but is not thought to be possible within the rail timetable and is no longer being considered.

- 1.2.4 At the peak of construction, the train movements are likely to occur on six nights per week.
- 1.2.5 Trains would travel from the south along the East Suffolk line, and join the Saxmundham to Leiston branch line, which would be refurbished. In the early years of the construction works, the trains would travel to a temporary unloading facility built on land east of Eastlands Industrial Estate.
- 1.2.6 A new rail extension, called the ‘green rail route’, will be constructed to a new unloading terminal on the northern side of the main SZC site, departing from the Saxmundham to Leiston branch line just west of Leiston. The green rail route is expected to be complete and in use within two years of the start of the project.
- 1.2.7 In the early years before the green rail route is complete, there will be a maximum of two trains per day, equating to four train movements, three of which we expect will be at night. Once the green rail route is complete, up to four trains per day will be run.

1.3 Previous Noise and Vibration Assessments

- 1.3.1 SZC Co. has submitted a suite of environmental assessments, considering the full range of potential effects that might arise from the SZC project.
- 1.3.2 The assessment of operational railway noise and vibration was originally set out in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)], including its associated **Appendix 4B** (Doc Ref 6.10) [[APP-546](#)]. The derivations of the assessment methods and criteria were set out in **Volume 1, Appendix 6G** of the **ES** (Doc Ref 6.1) [[APP-171](#)].
- 1.3.3 Additional noise surveys and assessment work carried out over the summer and autumn of 2020 resulted in a modification to the way in which railway noise, and in particular vibration, were assessed. The updated assessment was presented in **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)] and its associated appendices in **Volume 3, Appendices 9.3.A to 9.3.E** in the **ES Addendum** (Doc Ref 6.14) [[AS-257](#) and [AS-258](#)].
- 1.3.4 Three of the key findings from the previous assessments have informed the approach adopted in this supplemental assessment:
- the effect of the additional trains on the East Suffolk line during the daytime was found to be negligible;
 - at night, the increase in noise level over the whole of the night-time period along the East Suffolk line and the maximum levels due to the

peak of noise from individual passing trains would both result in a significant adverse effect for some receptors; and

- for all receptors, the most significant effects were determined by the maximum noise levels, assessed using the L_{AFmax} parameter, not the overall noise levels across the whole of the night-time period.

1.3.5 In light of these findings, this supplemental assessment focuses on the night-time period, and considers the maximum noise levels only. These two factors were found to be the combination that resulted in all adverse airborne railway noise effects in the previous assessments.

1.3.6 The previous noise and vibration assessments considered the potential effects of both the construction and operational use of rail infrastructure on nearby sensitive receptors. The receptors that were considered covered a range of sensitivities and geographically covered the route of the rail line from Westerfield junction to each of the freight terminals adjacent to the site.

1.3.7 The previous noise assessments considered effects using noise contour plots, which were calculated using information about the amount of noise that passing trains are likely to generate. The calculations used the calculation methods set out in the ‘Calculation of Railway Noise’ (CRN) [Ref 1], supplemented with data gathered through multiple train noise measurements, to identify representative maximum noise levels. CRN only considers average noise levels over daytime or night-time periods, so noise surveys were necessary to provide suitable data for the assessment of maximum noise levels.

1.3.8 The properties affected by noise from rail movements were aggregated according to the noise level to which they were predicted to be exposed, and a conclusion reached as to the overall effect of the project’s use of rail freight.

1.3.9 The potential for the railway noise assessment to develop and further consider certain types of residential accommodation was noted in **paragraph 1.6.6 of Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)], which stated:

‘In reviewing the potential noise levels we have undertaken research to identify the number of properties which may be impacted: estimated numbers of properties affected are as shown in Table 1.9 below. These numbers will continue to be reviewed including, where relevant, permanent residential caravans and houseboats identified.’

- 1.3.10 **Table 1.9 in Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546] summarised the number of properties anticipated to fall into bands of noise levels that equated to magnitudes of impact. **Table 1.9 in Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546] is replicated here as **Table 1.1**.

Table 1.1: Estimated numbers of properties exposed to different noise levels from proposed night time use of the East Suffolk line between Saxmundham and Westerfield junction

Noise level, L_{AFmax} , dB (free-field)	Estimated number of dwellings	
	No mitigation	Mitigation (no stops in Saxmundham)
60-70 ⁽¹⁾	390-410	320-350
70-77	150-160	100-110
Over 77	40-50	5-10

Note: ⁽¹⁾ **Table 1.9 in Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546] erroneously labelled this row as “60-79”; “60-70” is correct.

- 1.3.11 Updates to this table are included in this supplemental assessment, where necessary.
- 1.3.12 This supplemental assessment considers the potential noise effects from the use of the rail infrastructure for park homes located at Whitearch Park, south of Saxmundham, as anticipated in **paragraph 1.6.6 of Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546].
- 1.3.13 This supplemental assessment has been undertaken following formal and informal representations made to SZC Co. by the owner of Whitearch Park [RR-1265] and East Suffolk Council.
- 1.3.14 Only airborne noise from operational trains is considered in this supplemental assessment as the park homes are too far from the railway line to be significantly affected by groundborne noise or vibration.
- 1.3.15 No substantive construction works are proposed close to the park homes, so construction noise or vibration is not considered either. It is possible that there will be rail replacement along sections of the East Suffolk line, some of which falls under Network Rail’s regular maintenance programme, and some that are brought forward by SZC Co. All such works would be undertaken by Network Rail and are considered to be routine maintenance rather than substantive construction works.
- 1.3.16 SZC Co. has committed to two key mitigation schemes that are relevant to this supplemental assessment of railway noise and vibration:

- The **Noise Mitigation Scheme (Volume 2, Appendix 11H of the ES (Doc Ref 6.3) [APP-210]**.
- The 'Rail Noise Mitigation Strategy', set out in draft in **Volume 3, Appendix 9.3.E of the ES Addendum (Doc Ref 6.14) [AS-258]**.

1.3.17 The 'Noise Mitigation Scheme' will provide the means to improve the sound insulation of those properties that meet certain qualifying criteria. For railway noise, the criteria are:

- A. an offer for noise insulation based on averaging rail noise over the day and night time periods, which is consistent with the national Rail Noise Regulations.
 - (i)(a) the Future (Rail) Noise Levels exceed façade noise levels of 69dB $L_{Aeq,16hrs}$ during the hours of 07:00 to 23:00 or 58dB $L_{Aeq,8hrs}$ during the hours of 23:00 to 07:00;
 - (b) the Future (Rail) Noise Levels are at least 1dB higher than the Existing (Rail) Noise Levels as a result of the use of the new or amended railway line associated with the Development; and
 - (c) the contribution from the new or amended railway line associated with the Development to the Future (Rail) Noise Levels at the façade is at least 1dB; or
- B. an offer for noise insulation based on the max noise level created at night:
 - (ii) maximum sound level L_{AFmax} 73dB between 23:00 and 07:00 hours.

1.3.18 The same criteria are applied to noise resulting from SZC construction trains irrespective of whether they use existing rail lines or new / altered rail lines.

1.3.19 It should be noted that the 73dB façade L_{AFmax} threshold has been amended from the 80dB façade L_{AFmax} value originally set out in **Volume 2, Appendix 11H of the ES (Doc Ref 6.3) [APP-210]** as a result of discussions with the local planning authorities. The mitigation package has been strengthened in this respect.

1.3.20 The measures set out in the draft 'Rail Noise Mitigation Strategy' (**Volume 3, Appendix 9.3.E of the ES Addendum (Doc Ref 6.14) [AS-258]**) include:

- Installation of a crossover north of Saxmundham station and upgrades to the signalling system to permit trains to join or leave the Saxmundham to Leiston branch line without stopping, known as the ‘change arrangements at Saxmundham’.
- The Saxmundham to Leiston branch line will be upgraded with a refurbished trackbed, concrete or steel sleepers, and welded rails to provide a consistent rail cross-section consistent gauge, and smooth running surface.
- The proposed rail extension route will be constructed using the same approach as the upgraded Saxmundham to Leiston branch line.
- Under ballast mats will be installed where the Saxmundham to Leiston branch line or proposed rail extension route pass within 15 metres of a residential receptor, and will be installed for a minimum of 10 metres either side of the property. An alternative design may be substituted, if its effectiveness is equal and approved.
- Night-time speed limits of 10 mph will apply at three locations along the East Suffolk line: Woodbridge/Melton, Campsea Ashe, and Saxmundham.
- Speed on the Saxmundham to Leiston branch line will be limited to 10mph during the early years.
- Pending the results of further assessment of the upgraded and mitigated Saxmundham to Leiston branch line during the early years operation, the speed limit on Saxmundham to Leiston branch line may be increased to 20mph. This further assessment work is described later in this section.
- The speed limit on the proposed rail extension route will match that applied to the Saxmundham to Leiston branch line. This enables constant train speeds to be maintained, thereby avoiding accelerating locomotive noise close to the north-western corner of Leiston.
- Class 66 locomotives will be used in preference to Class 68 locomotives, where there is equivalent choice.
- Night-time construction trains will not travel into or out of Leiston, instead being held on the Saxmundham to Leiston branch line to the west of the Saxmundham Road level crossing, at defined locations.

- Construction trains stabled overnight on the branch line will not be permitted to keep their engines idling.

1.3.21 The majority of these measures relate to rail operations north or east of Saxmundham, however, the selection of quieter locomotives is relevant beyond this area and to this supplemental assessment.

2 ASSESSMENT CRITERIA

- 2.1.1 As set out in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)], the EIA methodology considers whether impacts from the proposed development would have an effect on any resources or receptors. The assessment broadly considers the magnitude of impacts and the value/sensitivity of resources/receptors that could be affected to classify effects.
- 2.1.2 The effect of noise and vibration on a receptor or community is dependent on the magnitude of the impact, the sensitivity of the receptor, and may also depend on other factors, such as the existing acoustic environment.
- 2.1.3 A detailed description of the assessment methodology used to assess the potential effects on noise and vibration arising from the proposed development is provided in **Volume 1, Appendix 6G** of the **ES** (Doc Ref 6.1) [[APP-171](#)].
- 2.1.4 The assessment criteria for airborne railway noise that are relevant to this supplemental assessment are summarised in this section.

2.2 Receptor Sensitivity

- 2.2.1 The criteria used to determine the sensitivity of potentially affected receptors are set out in **Table 2.1**.

Table 2.1: Assessment of the value or sensitivity of receptors for noise and vibration

Sensitivity	Description
High	Receptors that are highly sensitive to noise or vibration such as theatres, auditoria, recording studios, concert halls and highly vibration sensitive structures or uses such as certain laboratories medical facilities or industrial processes.
Medium	Noise and vibration sensitive receptors such as permanent residential buildings, hospitals and other buildings in health/community use, buildings in educational use, hotels and hostels.
Low	Receptors with limited sensitivity to noise and vibration such as offices, libraries buildings in religious use, and other workplaces with a degree of sensitivity due to the need to concentrate.
Very Low	Receptors of very low sensitivity to noise and vibration such as industrial or commercial buildings and transient or mobile receptors.

- 2.2.2 These same criteria have been used for the assessment set out in this supplemental assessment. Residential accommodation is considered to be medium sensitivity, including for park homes.

2.3 Impact Magnitude

- 2.3.1 The magnitude of impact as a result of airborne railway noise was assessed by applying different criteria, according to the existing level of rail service along a particular rail line.
- 2.3.2 For the East Suffolk line, with its regular, predominantly passenger-based service, it was the change in noise level from the existing situation that was used to quantify the magnitude of impact.
- 2.3.3 For new lines, or lines that are to be brought back into regular service, as would be the case for the Saxmundham to Leiston branch line and green rail route, absolute criteria were derived from noise policy and guidance, to correlate with a particular magnitude of impact.
- 2.3.4 For night-time rail movements, the maximum noise levels associated with the peak of noise from passing trains were assessed against absolute criteria, again, derived from noise policy and guidance, to correlate with a particular magnitude of impact.
- 2.3.5 As was noted in Section 1 of this supplemental assessment, the change in noise level along the East Suffolk line during the daytime was found to be negligible, as a result of a single freight train being run in addition to the regular passenger service.
- 2.3.6 During the night-time, changes in the average night-time noise levels were found to be significant in some locations, as a result of the additional night-time freight movements being added to the current night-time rail movements, which are limited.
- 2.3.7 It was found that the maximum sound levels from individual passing trains were the most significant indicator when determining the magnitude of impact. Wherever a significant adverse effect was found to have occurred as a result of the change in the overall night-time noise level, maximum noise levels from passing trains also gave rise to a significant adverse effect, which was generally more acute.
- 2.3.8 On the basis of these previous outcomes, this supplemental assessment therefore only considers the maximum noise levels from passing trains, and only those criteria relevant to maximum noise levels are set out here.
- 2.3.9 The maximum noise level criteria, which relate to the L_{AFmax} noise index, are set out in **Table 2.2**. The L_{AFmax} values in **Table 2.2** are extracted from **Table 4.7** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)].

Table 2.2: Maximum noise level thresholds to determine the magnitude of impact from rail movements (all values are free field).

Sensitivity of receptor	Period	Magnitude of impact				Parameter
		Very low	Low	Medium	High	
Medium	Night	<60	60	70	77	L _{AFmax} , dB

2.4 Application of Maximum Noise Level Thresholds to Park Homes

- 2.4.1 Maximum noise levels are the most commonly-used measure of sound when considering sleep disturbance, and it is in that context that they informed the assessment of railway noise and the magnitude of impact criteria in **Table 2.2**.
- 2.4.2 Guidance on sleep disturbance generally relates to sound levels within properties, where people are most likely to be sleeping. The thresholds in **Table 2.2** are external measures of noise, i.e. they are to be measured or calculated at a point outside of a property within which people may be sleeping.
- 2.4.3 This is the normal approach in noise assessments, since the noise can be measured outside the property without requiring access into a property, which might potentially disturb the occupants.
- 2.4.4 However, since the thresholds are defined outside the property, but the effect occurs within the property at known noise levels, the difference between the sound levels inside and outside the property is critical. A full explanation of the derivation of the values set out in **Table 2.2** can be found in **Sections 3.2 and 3.3 in Volume 3, Appendix 9.3.D of the ES Addendum** (Doc Ref 6.14) [[AS-257](#)].
- 2.4.5 In the context of this supplemental assessment, it is useful to understand how those values were derived, in broad terms, so that the appropriateness of the criteria for park homes can be determined.
- 2.4.6 The World Health Organisation's (WHO) 'Guidelines for Community Noise' [Ref 2] indicates that people sleeping may be disturbed when the internal noise levels exceed 45dB L_{AFmax} 10 to 15 times per night. SZC Co. has adopted a precautionary approach to the assessment of night-time railway noise and, rather than apply the '10 to 15 times' part of the WHO guidance, SZC Co. has instead worked on the basis that the potential sleep disturbance

could occur as a result of a single occurrence of noise above 45dB L_{AFmax} inside the property.

- 2.4.7 It is known that a partially open window in a typical house will reduce external noise levels by approximately 15dB; this reduction is based on the proportion of the external façade that is made up by the partially open window relative to the amount of brickwork.
- 2.4.8 The ‘low’ magnitude of impact is considered to occur where the external noise level exceeds 60dB L_{AFmax} , which is derived from the 45dB L_{AFmax} internal WHO threshold, allowing for the 15dB reduction through a partially open window, i.e. 45dB + 15dB = 60dB.
- 2.4.9 At the other end of the scale, research by Rice and Morgan [Ref 3] and Basner et al [Ref 4, Ref 5] suggests that there is likely to be a significant adverse effect on health and quality of life where the external maximum noise level exceeds 80 or 85dB L_{AFmax} , depending on the number of events. These external values relate to an internal level in the region of 65dB and, again, assume a partially open window.
- 2.4.10 SZC Co. has adopted the more stringent interpretation of the research on a precautionary basis. The 80dB L_{AFmax} value is a façade value, measured 1m in front of the building façade, which is generally 3dB higher than the value that would occur at the same location if the building were not present. The difference is caused by sound reflecting off the building façade, effectively doubling sound pressure level at a point 1m in front of the building; a doubling of the sound pressure causes a 3dB increase in level, as noise is measured on a logarithmic scale.
- 2.4.11 The ‘high’ magnitude of impact in **Table 2.2** is a free-field value, which is a value measured away from any reflecting surfaces other than the ground, and is therefore 3dB lower than the façade level, i.e. 77dB instead of 80dB.
- 2.4.12 The ‘medium’ magnitude of impact in **Table 2.2** is the only value that is not based on the assumption that a window is partially open. It is derived from the same 45dB L_{AFmax} internal noise level that the WHO suggests marks the onset of sleep disturbance, but the correction applied to obtain an external noise level is based on a closed double-glazed window, which will typically reduce external noise levels by 25dB.
- 2.4.13 The important point in the context of this supplemental assessment is that if the sound reduction provided by the external fabric of park homes is less than 25dB, for example as a result of the use of lighter materials than are typically used in housebuilding, then an impact equivalent to the medium magnitude of impact could occur at a lower external noise level than the 70dB stated in **Table 2.2**.

- 2.4.14 The implications for the assessment of the sound reduction provided by the external fabric of park homes being less than 25dB are considered later in this supplemental assessment.

2.5 Classification of Effects

- 2.5.1 Following the classification of the magnitude of the impact and the value/sensitivity of the receptor/feature, the effect has been classified as shown in **Table 2.3** (originally **Table 4.11** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]).

Table 2.3: Classification of effects.

		Value/Sensitivity of Receptor			
		Very Low	Low	Medium	High
Magnitude	Very low	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Minor	Minor	Moderate
	Medium	Minor	Minor	Moderate	Major
	High	Minor	Moderate	Major	Major

- 2.5.2 Definitions of each of the different levels of effect, which can be adverse, beneficial or neutral are shown in **Table 2.4** (originally **Table 4.12** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]).

Table 2.4: Effect definitions

Effect	Description
Major	The noise causes a material change in behaviour attitude or other physiological response. Adverse change may result in the potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished or improved due to change in acoustic character of the area.
Moderate	Effects that may result in moderate changes in behaviour, attitude or other physiological response. Adverse effects may result in some reported sleep disturbance. Changes to the acoustic character of the area such that there is a perceived change in the quality of life.
Minor	Effects that may result in small changes in behaviour attitude or other physiological response. Adverse effects may result in some minor reported sleep disturbance. Small changes to the acoustic character of the area such that there is a low perceived change in the quality of life.
Negligible	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.

2.5.3 Following the classification of an effect as detailed in **Tables 2.3** and **2.4**, a clear statement has been made as to whether the effect is ‘significant’ or ‘not significant’ in terms of the EIA Regulations [Ref 6]. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant.

2.6 Use of LOAEL and SOAEL values in the assessment

2.6.1 In line with the ‘National Policy Statement for Energy’ (NPS EN-1) [Ref 7] and the ‘Noise Policy Statement for England (NPSE) [Ref 8], levels for the lowest observed adverse effect on health and quality of life (LOAEL) and the significant observed adverse effects on health and quality of life (SOAEL) have been established for the assessment of railway noise. **Table 2.5** sets out broad descriptions of these categories, and the actions required for each.

2.6.2 **Table 2.5** was originally **Table 4.13** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)].

Table 2.5: Generic effect descriptions and recommended actions

Effect	Description	Action
Below LOAEL	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No specific measures required.
Between LOAEL and SOAEL	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Mitigate and reduce to a minimum.
Above SOAEL	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Avoid

2.6.3 The LOAEL and SOAEL values for railway noise that are relevant to this supplemental assessment are set out in **Table 2.6** (extracted from **Table 4.16** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]).

Table 2.6: LOAEL and SOAEL values for railway noise (all free-field values)

Time Period	LOAEL	SOAEL
Night (23:00-07:00)	60dB L _{AFmax}	77dB L _{AFmax}

2.6.4 The derivation of these values is detailed in **Volume 1 Appendix 6G** and **Annex 6G.1** of the **ES** (Doc Ref 6.1)) [\[APP-171\]](#), with further detail set out in **Volume 3, Appendix 9.3.D** of the **ES Addendum** (Doc Ref 6.14) [\[AS-257\]](#). The LOAEL and SOAEL values match the ‘low’ and ‘high’ magnitudes of impact, respectively.

3 MODIFICATIONS TO THE NOISE MODELLING

- 3.1.1 As noted in Section 1 of this supplemental assessment, the assessment of railway noise and vibration was set out in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)], including its associated **Appendix 4B** (Doc Ref 6.10) [[APP-546](#)], with the derivation of the assessment methods and criteria set out in **Volume 1, Appendix 6G** of the **ES** (Doc Ref 6.1) [[APP-171](#)].
- 3.1.2 Additional noise surveys and assessment work carried out over the summer and autumn of 2020 modified the way in which railway noise, and in particular vibration, were assessed. The updated assessment was presented in **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)] and its associated appendices in **Volume 3, Appendices 9.3.A to 9.3.E** in the **ES Addendum** (Doc Ref 6.14) [[AS-257](#) and [AS-258](#)].
- 3.1.3 This supplemental assessment further considers the potential effects on park homes located at Whitearch Park, south of Saxmundham where residential accommodation exists in the form anticipated in paragraph 1.6.6 of **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)].
- 3.1.4 This section identifies the modifications or refinements made to the noise modelling process for this supplemental assessment.

3.2 Source Data

- 3.2.1 The source data used in this supplemental assessment are the same as were used previously in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]. As was noted in **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)], the additional noise survey and assessment work carried out over the summer and autumn of 2020 suggested that the L_{AFmax} levels used in the original noise modelling were higher than were likely to occur in practice.
- 3.2.2 Notwithstanding this, the original, higher values were retained to present a robust assessment, and these values have been used again here.
- 3.2.3 The height of the source assumed in the L_{AFmax} calculations has been modified as a result of the additional survey and assessment work undertaken over the summer and autumn of 2020.
- 3.2.4 The original noise calculations presented in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)] were based on the effective height of the source being either at rail level for locomotives not on full power, or at a height of 4m above rail level for locomotives on full power. These source

heights are specified in the ‘Calculation of Railway Noise’ (CRN) [Ref 1]. For clarity, locomotives will tend to operate on full power when accelerating.

3.2.5 The additional survey and assessment undertaken over the summer and autumn of 2020 suggested that the effective source height for a locomotive not operating on full power was between 2 and 3m above rail level, not at rail level; the source of peaks of noise appearing to come from the side of the locomotive, not from close to the wheels, as suggested in CRN.

3.2.6 On the basis of this additional information, the source height used in this supplemental assessment was either 4m above rail level for locomotives operating on full power, or 3m above rail level for locomotives not operating on full power.

3.3 Other Modelling Updates

3.3.1 Since this supplemental assessment focuses on a discrete area adjacent to the railway line, higher resolution topographical and building height data have been incorporated into the noise modelling software, and the noise contour plots have been calculated at a higher resolution.

3.3.2 Based on a visual inspection of the area, significant reflecting and screening structures have been included in the noise modelling software.

3.3.3 The potential sound reduction provided by the external fabric of the park homes has been estimated using professional judgment and publicly-available information; no sound insulation tests have been undertaken to determine the actual sound reduction performance of the external fabric of individual park homes.

3.3.4 To account for the lower height of the receptors considered in this supplemental assessment, all of the modelling uses a receptor height of 1.5m above ground level, as opposed to the 4.5m above ground level in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)] and **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)].

4 NOISE ASSESSMENT

4.1 Background Information

4.1.1 Whitearch Park, at Main Road, Benhall, Saxmundham IP17 1NA, has been developed to provide what it describes as ‘residential retirement homes’ using site or park homes.

4.1.2 The northern part of the site has been developed recently and, according to the website, further development is planned across the southern part of the site. The site layout plan is shown in Plate 4.1.

Plate 4.1: Whitearch Park



4.1.3 It is not known if all of the park homes shown in Plate 4.1 have been built, some may only be proposed at this stage. However, the layout shown in Plate 4.1 has been used as the basis for this supplemental assessment on the precautionary assumption that all of the park homes are present.

4.2 Assessment Criteria

- 4.2.1 The required specification for a residential park home is set out in BS 3632:2015 'Residential park homes – Specification' [Ref 9]. In relation to sound reduction performance, the standard states at paragraph 4.9.4:

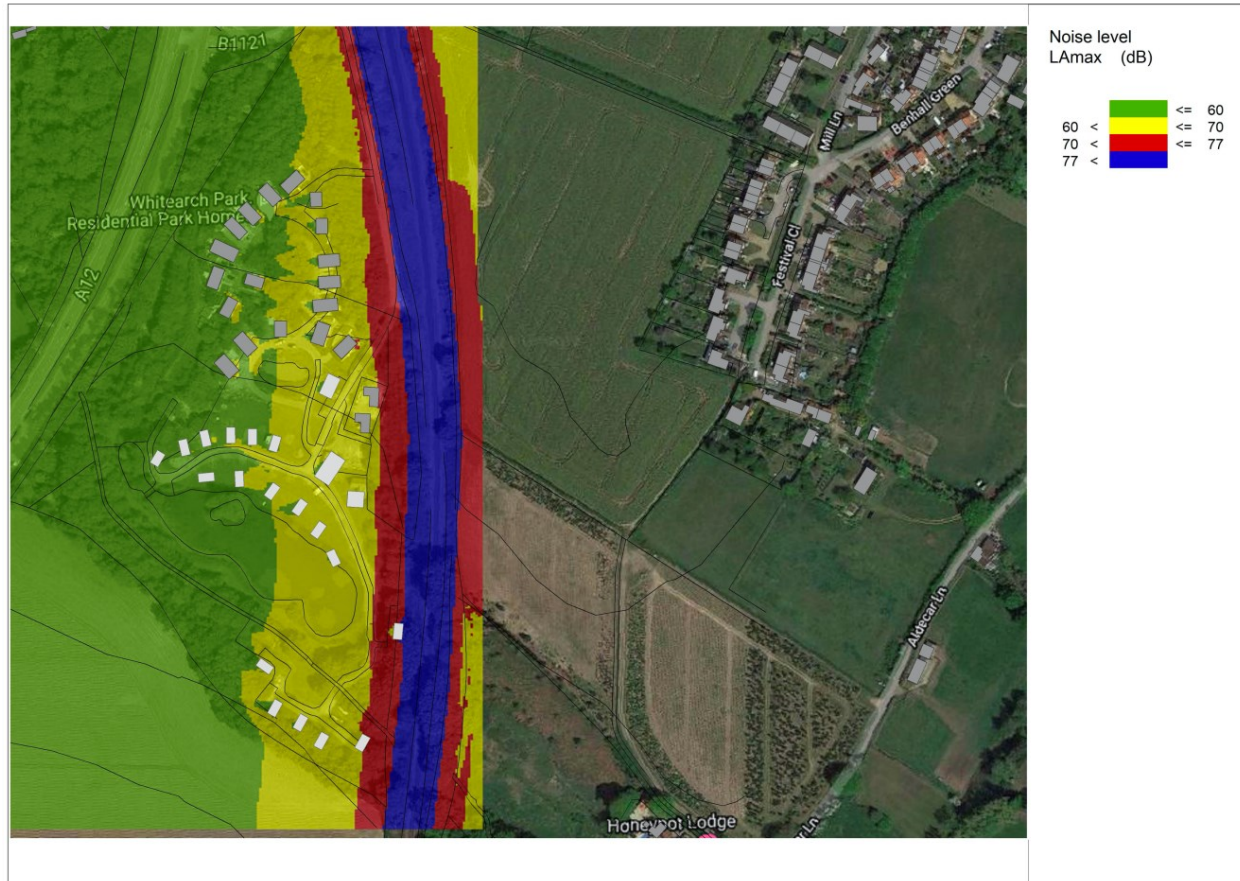
'In order to minimize the transmission of airborne noise, the external walls (excluding doors and windows) shall have a sound reduction index (R) of 35 dB over a frequency range of 125 Hz to 4 000 Hz.'

- 4.2.2 Since the residential park homes at Whitearch Park are newly-built, it is likely that they will meet this standard. It is also likely that their windows would be at least equivalent to modern, standard double-glazing and would therefore achieve sound reduction of at least 25dB.
- 4.2.3 On the basis that the external fabric of the park homes is likely to have a sound reduction of at least 25dB, the same magnitude of impact categories as set out in **Table 2.2** can be used for them.
- 4.2.4 The LOAEL and SOAEL values were based on a lower sound reduction through an open window of 15dB, and it is considered that these values will remain valid for park homes with partially open windows.

4.3 Predicted levels

- 4.3.1 Train noise levels (L_{AFmax}) have been predicted using SoundPLAN 3D noise modelling software, based on the approach described in Section 3 of this supplemental assessment.
- 4.3.2 The predicted noise contours are shown in Plate 4.2.

Plate 4.2: Noise contours for residential park homes at Whitearch Park



- 4.3.3 It can be seen from Plate 4.2 that the majority of the park homes are predicted to be subject to night-time L_{AFmax} levels below 70dB (green and yellow shaded areas); two of the existing park homes are predicted to have noise levels of between 70dB and 77dB (red shaded area), with one park home predicted to be just over 77dB (blue shaded area).
- 4.3.4 The magnitudes of impact would therefore be either low or very low for the majority of park homes, which would equate to negligible or minor adverse effects when their medium sensitivity is taken into account. These would not be significant in terms of the EIA Regulations.
- 4.3.5 For the three park homes predicted to have L_{AFmax} noise levels of 70dB or more, a moderate adverse effect is predicted at two and a major adverse effect at one, all of which would be significant in terms of the EIA Regulations.
- 4.3.6 For all park homes except one, the outcomes would fall between the LOAEL and SOAEL. In planning policy terms, the requirement would be to mitigate and reduce noise to a minimum. For the single park home predicted to be

expose to L_{AFmax} noise levels above 77dB, planning policy requires the effect to be avoided, which can be achieved through the ‘Noise Mitigation Scheme’ (**Volume 2, Appendix 11H** of the **ES** (Doc Ref 6.3) [[APP-210](#)]).

4.4 Mitigation

- 4.4.1 As noted in Section 1 of this supplemental assessment, the draft ‘Rail Noise Mitigation Strategy’ (**Volume 3, Appendix 9.3.E** of the **ES Addendum** (Doc Ref 6.14) [[AS-258](#)] sets out the operational and physical mitigation that has been embedded into the operational use of the East Suffolk line.
- 4.4.2 Three of the park homes are predicted to be subject to noise levels of more than 70dB L_{AFmax} , and therefore would be eligible for sound insulation under the ‘Noise Mitigation Scheme’ (**Volume 2, Appendix 11H** of the **ES** (Doc Ref 6.3) [[APP-210](#)]).
- 4.4.3 The windows of the park homes are likely to be modern double-glazed units and therefore capable of achieving a sound reduction of at least 25dB. Similarly, it is expected that the sound reduction provided by the walls will be at least 35dB, given their good quality build and likely compliance with the materials specification for such buildings.
- 4.4.4 Overall, the sound reduction of the buildings will be no lower than the 25dB reduction adopted in the derivation of the 70dB L_{AFmax} eligibility threshold in the Noise Mitigation Scheme.
- 4.4.5 It is considered that the improvements in sound insulation offered by the Noise Mitigation Scheme will be achievable for the park homes and a betterment in the sound reduction performance of the external fabric of the park homes attained. On this basis, the SOAEL will be avoided for the one park home that is predicted to be exposed to the highest noise level, and the internal sound levels within all three park homes will be mitigated and minimised as required more generally by policy.
- 4.4.6 Consideration has also been given to mitigation in the form of the installation of an acoustic barrier between the site and the railway.
- 4.4.7 Three acoustic barrier locations have been assessed, these being close to the railway line on Network Rail’s land, along the boundary between Whitearch Park and the railway, and close to the park homes themselves.
- 4.4.8 The optimum solution was found to be an acoustic barrier along the boundary between Whitearch Park and the railway, which avoids impacting Network Rail’s operations and avoids encroaching on the park homes themselves.

- 4.4.9 A 2.5m high acoustic barrier has been tested to illustrate the benefits that could be gained, and the resultant L_{AFmax} noise contours are shown in Plate 4.3.

Plate 4.3: Noise contours for Whitearch Park – with acoustic barrier



- 4.4.10 The acoustic barrier is predicted to result in L_{AFmax} noise levels of less than 70dB at all of the park homes. This would result in effects that are no worse than minor adverse, which are not significant. It would also avoid the need to alter the external fabric of the park homes under the Noise Mitigation Scheme.
- 4.4.11 To be effective, the acoustic barrier will need to be imperforate, sealed at the base, and have a superficial density of at least 18kg/sq.m.
- 4.4.12 SZC Co. proposes to further amend the Noise Mitigation Scheme to make specific provision for the potential erection of an acoustic barrier at Whitearch Park. Any such barrier would be subject to discussion with the relevant authorities, including Network Rail, East Suffolk Council and Benhall and Sternfield Parish Council, the owner and residents at Whitearch Park, and subject to the necessary permissions and further assessment of other potential environmental effects, prior to any decision

whether or not to install any barriers. In any event and as set out above, compliance with policy in terms of the impacts does not depend on the provision of barriers.

5 CONCLUSIONS

- 5.1.1 This supplemental assessment provides further information on the potential effects of night-time railway noise on the park homes at Whitearch Park, south of Saxmundham.
- 5.1.2 The assessment shows that two of the park homes could be exposed to L_{AFmax} noise levels of between 70dB and 77dB, with one of them predicted to be exposed to L_{AFmax} noise levels of more than 77dB. These park homes would be subject to moderate or major adverse effects, which are considered to be significant in terms of the EIA Regulations.
- 5.1.3 The levels would be below the SOAEL in all instances, except for the single park home predicted to be exposed to L_{AFmax} noise levels above 77dB, which will exceed SOAEL.
- 5.1.4 It is considered that the improvements in sound insulation offered by the Noise Mitigation Scheme (**Volume 2, Appendix 11H** of the **ES** (Doc Ref 6.3) [[APP-210](#)]) will be achievable for the park homes given their modern, high quality construction. On this basis, the SOAEL will be avoided for the one park home that is predicted to be exposed to the highest noise level, and the internal sound levels within all three park homes will be mitigated and minimised as required more generally by policy.
- 5.1.5 The remaining park homes are predicted to be subject to L_{AFmax} noise levels of less than 70dB, which will equate to no more than minor adverse effects, which are not significant in terms of the EIA Regulations.
- 5.1.6 An acoustic barrier between the railway line and the park homes has also been shown to be effective at reducing noise levels at the site, so that none of the park homes would be exposed to L_{AFmax} noise levels of 70dB or more.
- 5.1.7 SZC Co. proposes to revise the Noise Mitigation Scheme to enable the potential installation of an acoustic barrier between Whitearch Park and the railway line. Any such barrier would be subject to discussion with the relevant authorities, the owner and residents at Whitearch Park, and the necessary permissions. In any event, compliance with policy in terms of the impacts does not depend on the provision of barriers.
- 5.1.8 On the basis of this further assessment, **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)] would be updated as shown in **Table 5.1**. The figures in **Table 5.1** include the additional park homes considered in this supplemental assessment, plus houseboats along the River Deben in Woodbridge, which have been subject to a similar assessment.

Table 5.1: Updated estimated of numbers of properties exposed to different noise levels from proposed night time use of the East Suffolk line between Saxmundham and Westerfield junction

Noise level, L_{AFmax} , dB (free-field)	Estimated number of dwellings	
	No mitigation	Mitigation (no stops in Saxmundham)
60-70 ⁽¹⁾	424-444	349-379 ⁽²⁾
70-77	152-162	100-110
Over 77	41-51	5-10

Notes:

⁽¹⁾ Table 1.9 in Volume 9, Appendix 4B of the ES (Doc Ref 6.10) [APP-546] erroneously labelled this row as “60-79”; “60-70” is correct.

⁽²⁾ Excludes any benefits from a potential acoustic barrier to screen houseboats in the Woodbridge area

REFERENCES

1. Department of Transport (1995) Calculation of Railway Noise (CRN)
2. World Health Organisation (1999) Guidelines for community noise
3. C.G. Rice and P.A. Morgan (1982) ISVR Technical Memorandum No 623 A Synthesis of Studies on Noise-Induced Sleep Disturbance
4. Basner et al, Aircraft noise effects on sleep: Application of the results of a large polysomnographic field study, Journal of the Acoustical Society of America **119**, 2772 (2006)
5. Basner et al, Single and combined effect of air, road and rail traffic noise on sleep and recuperation, SLEEP 2011; 34(1):11-23 (2011)
6. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017 No 572)
7. DECC (2011) Overarching National Policy Statement (NPS) for Energy (NPS EN-1)
8. DEFRA (2010) Noise Policy Statement for England
9. British Standard 3632: 2015 Residential park homes – Specification

NOT PROTECTIVELY MARKED

APPENDIX 21D HOUSEBOATS IN WOODBRIDGE TARGETED CONSULTATION INFORMATION

NOT PROTECTIVELY MARKED

11 May 2021

Dear Resident,

The Sizewell C Project, PINS Reference Number EN010012
Targeted consultation on rail noise impacts between 12 May and 11 June 2021 (inclusive)

On 27 May 2020, NNB Generation Company (SZC) Limited ('**SZC Co.**') made an application to the Planning Inspectorate under the Planning Act 2008 for a Development Consent Order for the Sizewell C Project ('**Application**'). The Application was accepted for examination by the Planning Inspectorate on 24 June 2020 (Application Reference: EN010012). An Examining Authority was appointed on 30 June 2020 to examine the Application. The examination commenced on 14 April 2021 and is due to be completed by 14 October 2021.

As part of the Application, an Environmental Statement (Examination Library refs. APP-159 to APP-582) was submitted to the Planning Inspectorate in May 2020, which included an assessment of rail noise arising from the transport of construction materials by train on the East Suffolk Line. An Environmental Statement Addendum (Examination Library refs. AS-179 to AS-260) was subsequently submitted in January 2021, which included an updated assessment of rail noise. These documents, together with all of the other Application documents, are available for inspection free of charge on the webpage relating to the Application on the Planning Inspectorate's website under the 'Documents' tab: <https://infrastructure.planninginspectorate.gov.uk/projects/eastern/the-sizewell-c-project/?ipcsection=docs>

The rail noise assessment in the May 2020 Environmental Statement explained, at paragraph 1.6.6 of Volume 9, Appendix 4B (Examination Library ref. [APP-546](#)), that:

"In reviewing the potential noise levels we have undertaken research to identify the number of properties which may be impacted: estimated numbers of properties affected are as shown in Table 1.9 below. These numbers will continue to be reviewed including, where relevant, permanent residential caravans and houseboats identified."

As committed to in the May 2020 Environmental Statement, we have continued to review the likely rail noise impacts of the Sizewell C Project. In particular, we have undertaken a more detailed assessment of the impact of rail noise on houseboats on the River Deben in Woodbridge. SZC Co. has prepared the enclosed document, entitled 'Sizewell C Noise Assessment and Mitigation Plan - Houseboats' and an associated summary document, to explain the results of this assessment and to identify the mitigation measures that are proposed in respect of the likely impacts that have been identified.

We are writing to you to offer you the opportunity to submit to SZC Co. any comments that you may have on the Application including the further rail noise assessment that we have undertaken and the proposed mitigation measures that we have identified. Please label any responses as **"Targeted consultation on rail noise impacts/mitigation"** and ensure that they are submitted to SZC Co. by **Friday 11 June 2021** via one of the following methods:

- Email comments to info@sizewellc.co.uk
- Post comments to FREEPOST SZC CONSULTATION (no stamp or further address required)
- If you are shielding and unable to use the above methods, call Freephone 0800 197 6102 (09:00 – 17:00 Monday to Friday) to arrange for your response to be collected

SZC Co. will have regard to any consultation responses received. We will also provide any responses to the Examining Authority (at Deadline 3) who are conducting the examination to inform their consideration of the Application. The Examining Authority may publish these responses at: <https://infrastructure.planninginspectorate.gov.uk/projects/eastern/the-sizewell-c-project/>

If you would like to know more about the development consent process, including the examination stage, a step by step guide has been produced by the Planning Inspectorate, entitled Advice Note Eight: Overview of the nationally significant infrastructure planning process for members of the public and others. This can be found at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

Details of how the Application will be examined and a copy of the examination timetable can be found in the Rule 8 letter published on 21 April 2021, which is available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-003597-Rule%208%20Letter%20and%20Annexes.pdf>

Yours sincerely,

Carly Vince

Chief Planning Officer

Enc. Sizewell C Noise Assessment and Mitigation Plan – Houseboats

Sizewell C Noise Assessment and Mitigation Plan – Houseboats – Summary Document



Sizewell C targeted consultation:

Rail noise at houseboats on the River Deben in Woodbridge and Melton

Proposals for Sizewell C, a new nuclear power station on the Suffolk coast, and associated development, are currently being examined by the Planning Inspectorate, the agency that deals with national infrastructure planning.

This follows our (NNB Generation Company (SZC) Limited) May 2020 submission of an application for development consent for the project, which included an assessment of potential noise effects of Sizewell C freight trains running on the East Suffolk line.

Since submission of the application, we have carried out additional work to further consider potential effects on houseboats on the River Deben at Woodbridge and Melton.

This document outlines the findings of this work, while a detailed report of the assessment can be found in the Sizewell C Noise Assessment and Mitigation Plan - Houseboats.

We are now seeking feedback on the additional assessment work in this targeted consultation which closes on Friday 11 June 2021.

If you have any comments you can send responses by email to info@sizewellc.co.uk, or by post to **FREEPOST SZC CONSULTATION** (no stamp or further address required).

If you are unable to use email or post, please call **0800 197 6102** (9am – 5pm, Monday to Friday) to arrange for your response to be collected.

Construction transport: rail

We are proposing to use road, rail and sea-based transport to move materials for the construction of Sizewell C. At the peak of construction, our rail proposals provide for up to four trains a day (eight movements, and we expect seven of these to be at night), operating five and sometimes six days a week.

Trains would travel from the south along the East Suffolk line, joining the refurbished Saxmundham to Leiston branch line, and unloading at a temporary facility on land east of Eastlands Industrial Estate. We are also proposing to build a temporary rail extension (the 'green rail route') from just west of Leiston to a new unloading terminal on the northern side of the Sizewell C site.

This will be in use within two years of the start of the project, running up to four trains a day. While the green rail route is being built, a maximum of two trains a day (four movements, three of which we expect will be at night) will run along the refurbished Saxmundham to Leiston branch line.

Our rail proposals also include a commitment to mitigation through the:

- 1. **Noise Mitigation Scheme**, providing improved sound insulation for properties meeting qualifying criteria; and
- 2. **Rail Noise Mitigation Strategy**, which includes measures to reduce train noise by, for example, improving trackbeds and rails for smoother running, upgrading signalling, limiting night speeds to 10mph at some locations, and using quieter locomotives.

The details of these proposals can be found in the Planning Inspectorate's Examination Library as documents [APP-210] and [AS-258].

If you have difficulties accessing these documents online, please contact us by email, post, or phone (0800 197 6102 open 9am – 5pm, Monday to Friday) and we will provide you with hard copies.

Additional assessment

Our additional assessment of rail noise focuses on potential airborne noise at certain locations affected by Sizewell C construction trains, including houseboats on the River Deben at Woodbridge and Melton.

It considers maximum noise levels at night, which earlier assessments showed as having the most impact due to the change in noise level, since there are currently limited night-time rail movements.

Assessments were carried out in line with government policy, which sets tests for noise based on the lowest observed adverse effect on health and quality of life (LOAEL) and significant observed adverse effects on health and quality of life (SOAEL).

For night-time (11pm to 7am) railway noise, the LOAEL is considered to be 60dB LAFmax and the SOAEL is considered to be 77dB LAFmax. Policy requires levels between the LOAEL and SOAEL to be mitigated and reduced to a minimum, while levels above the SOAEL should be avoided.

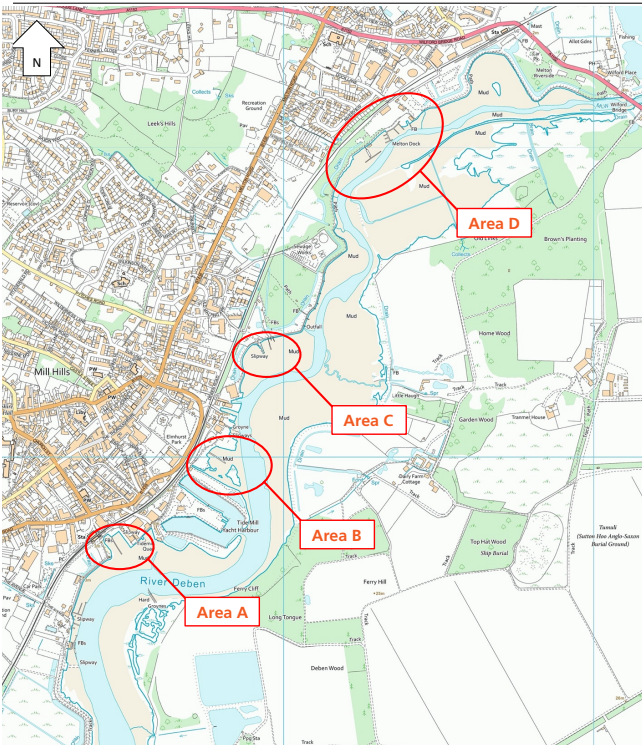


Figure 1

Rail noise at houseboats on the River Deben at Woodbridge and Melton

There are four areas along the River Deben at Woodbridge and Melton (as shown in Fig. 1) – opposite Woodbridge Station, to the north of Tide Mill Yacht Harbour, to the north east of Lime Kiln Quay, and near to Melton Dock (see Noise Assessment and Mitigation Plan - Houseboats for details) - where houseboats could potentially be affected by rail noise.

The houseboats at Woodbridge and Melton are too far from the railway line to be significantly affected by ground-borne noise or vibration from construction trains or are disconnected from the land in such a way that the transmission of ground-borne noise or vibration will be greatly reduced.

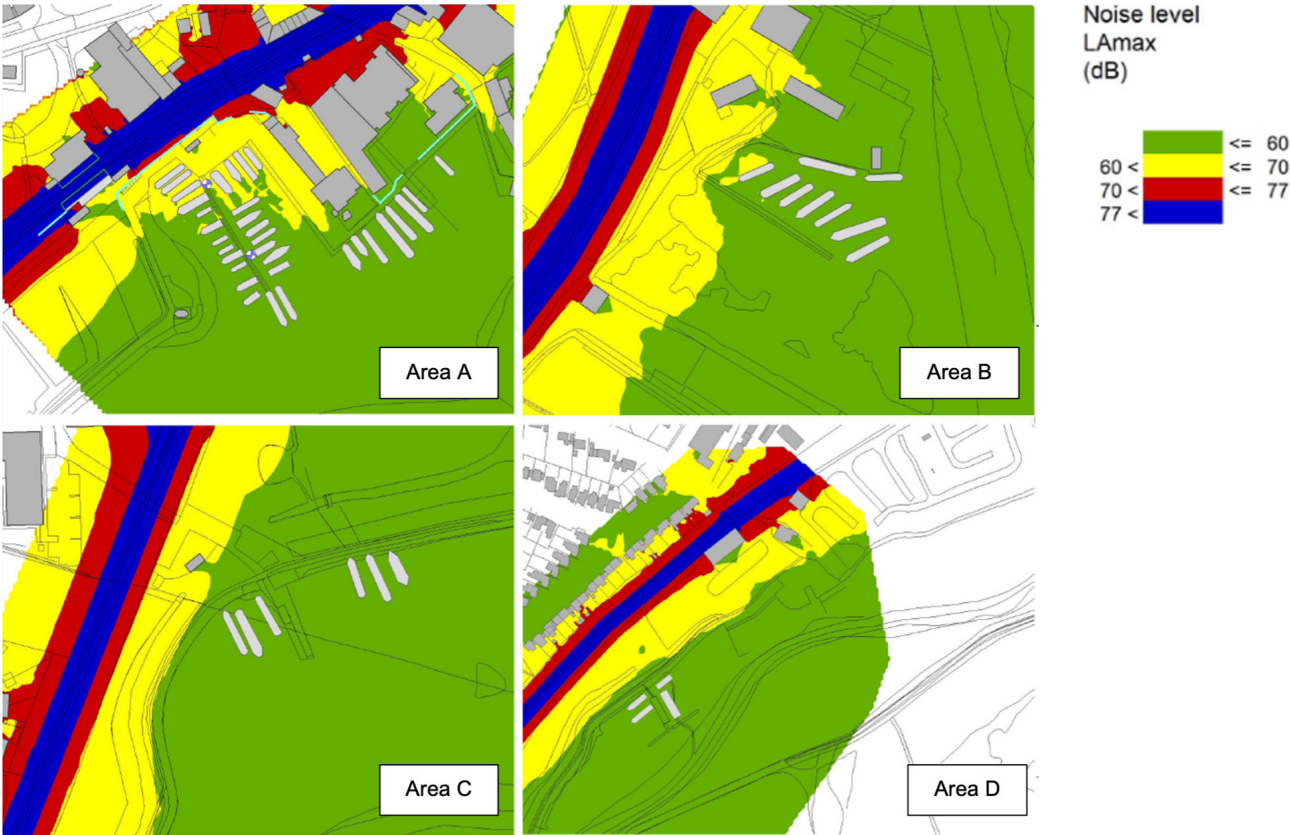
Similarly, while Network Rail may do work to improve some sections of the East Suffolk line, it would be considered

routine maintenance rather than substantive construction works, so we have not considered construction noise or vibration here.

None of the houseboats are predicted to be exposed to night-time noise levels above 70dB, as can be seen from Figure 2, where none of the houseboats fall into the red or blue shaded areas. The majority are predicted to experience night-time noise levels below 60dB, with others at levels between 60dB and 70dB, i.e. the yellow and green shaded areas in Figure 2. While all houseboats will be below the LOAEL or between the LOAEL and SOAEL, the external fabric or state of repair of some boats could mean residents are affected by rail noise.

Our assessment predicts that houseboats in the 60dB to 70dB range could qualify for mitigation. We are proposing to amend the Noise Mitigation Scheme as the Examination progresses to allow for a more flexible approach to providing noise insulation for these houseboats.

Figure 2





Additional potential mitigation measures

While the Noise Mitigation Scheme and Rail Noise Mitigation Strategy will reduce noise as required by policy, we are also working with Network Rail to explore the potential for installing acoustic barriers or noise screens between the railway line and some houseboats.

If acoustic screening is feasible and acceptable, we will amend the Noise Mitigation Scheme to enable it, however it will require further discussion with the boat owners and mooring owners, plus further assessment of potential environmental effects and planning permission from the local authorities would also be required.

This process would be separate to the planning process for Sizewell C and we will continue to engage with boat owners and mooring owners.

We will consider providing help with moving houseboats within the marina, or within the area, if desired by houseboat owners. Given the levels of predicted noise and proposed mitigation, we do not consider this will be necessary, particularly as the other mitigation measures are considered to be effective.

CONTACT

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*Calls to 0800 numbers are free from UK landlines. Call costs from mobile and international numbers may vary.

**By appointment between 10am and 4pm Monday to Friday.





The Sizewell C Project

Noise Assessment and Mitigation Plan - Houseboats

Revision: 1.0
Applicable Regulation: Regulation 5(2)(q)
PINS Reference Number: EN010012

May 2021

Planning Act 2008
Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009



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1 INTRODUCTION

1.1 Overview

1.1.1 NNB Generation Company (SZC) Limited ('SZC Co.') has made an application to the Planning Inspectorate under the Planning Act 2008 for a Development Consent Order (DCO) for the Sizewell C Project. The application is currently the subject of an examination by the Planning Inspectorate (application reference EN010012).

1.1.2 As part of the application, an Environmental Statement was submitted to the Planning Inspectorate in May 2020, which included an assessment of rail noise arising from the transport of construction materials by train on the East Suffolk line. An Environmental Statement Addendum was subsequently submitted in January 2021, which included an updated assessment of rail noise.

1.1.3 This document provides a more detailed assessment of potential noise effects from the use of the rail infrastructure on houseboats along the River Deben in Woodbridge and Melton. This more detailed assessment has been undertaken as envisaged in **paragraph 1.6.6 of Volume 9, Appendix 4B of the ES** (Doc Ref 6.10) [[APP-546](#)].

1.1.4 Sections 1, 2 and 3 set out relevant background information, to provide context for the noise assessment which is set out in section 4.

1.2 Proposed Development

1.2.1 To facilitate the construction of SZC, a combination of transportation modes is proposed to deliver construction materials to the site. The proposed transportation modes are road, rail and sea-based.

1.2.2 This supplemental assessment focuses on the potential for airborne noise effects from rail movements, as the locations considered will be most-affected by that particular mode of transportation.

1.2.3 The 'Freight Management Strategy' (Doc Ref 8.18) [[AS-280](#)] for the project provides for up to four trains per day at the peak of construction, equating to eight train movements per day. Of these eight train movements per day, it is envisaged that seven movements will occur at night, as there is insufficient rail capacity during the daytime. The possibility of a fifth train each day has been investigated with Network Rail but is not thought to be possible within the rail timetable and is no longer being considered.

- 1.2.4 At the peak of construction, the train movements are likely to occur on six nights per week.
- 1.2.5 Trains would travel from the south along the East Suffolk line, and join the Saxmundham to Leiston branch line, which would be refurbished. In the early years of the construction works, the trains would travel to a temporary unloading facility built on land east of Eastlands Industrial Estate.
- 1.2.6 A new rail extension, called the 'green rail route', will be constructed to a new unloading terminal on the northern side of the main SZC site, departing from the Saxmundham to Leiston branch line just west of Leiston. The green rail route is expected to be complete and in use within two years of the start of the project.
- 1.2.7 In the early years before the green rail route is complete, there will be a maximum of two trains per day, equating to four train movements, three of which we expect will be at night. Once the green rail route is complete, up to four trains per day will be run.

1.3 Previous Noise and Vibration Assessments

- 1.3.1 SZC Co. has submitted a suite of environmental assessments, considering the full range of potential effects that might arise from the SZC project.
- 1.3.2 The assessment of operational railway noise and vibration was originally set out in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)], including its associated **Appendix 4B** (Doc Ref 6.10) [[APP-546](#)]. The derivations of the assessment methods and criteria were set out in **Volume 1, Appendix 6G** of the **ES** (Doc Ref 6.1) [[APP-171](#)].
- 1.3.3 Additional noise surveys and assessment work carried out over the summer and autumn of 2020 resulted in a modification to the way in which railway noise, and in particular vibration, were assessed. The updated assessment was presented in **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)] and its associated appendices in **Volume 3, Appendices 9.3.A to 9.3.E** in the **ES Addendum** (Doc Ref 6.14) [[AS-257](#) and [AS-258](#)].
- 1.3.4 Three of the key findings from the previous assessments have informed the approach adopted in this supplemental assessment:
- the effect of the additional trains on the East Suffolk line during the daytime was found to be negligible;
 - at night, the increase in noise level over the whole of the night-time period along the East Suffolk line and the maximum levels due to the

peak of noise from individual passing trains would both result in a significant adverse effect for some receptors; and

- for all receptors, the most significant effects were determined by the maximum noise levels, assessed using the L_{AFmax} parameter, not the overall noise levels across the whole of the night-time period.

1.3.5 In light of these findings, this supplemental assessment focuses on the night-time period, and considers the maximum noise levels only. These two factors were found to be the combination that resulted in all adverse airborne railway noise effects in the previous assessments.

1.3.6 The previous noise and vibration assessments considered the potential effects of both the construction and operational use of rail infrastructure on nearby sensitive receptors. The receptors that were considered covered a range of sensitivities and geographically covered the route of the rail line from Westerfield junction to each of the freight terminals adjacent to the site.

1.3.7 The previous noise assessments considered effects using noise contour plots, which were calculated using information about the amount of noise that passing trains are likely to generate. The calculations used the calculation methods set out in the 'Calculation of Railway Noise' (CRN) [Ref 1], supplemented with data gathered through multiple train noise measurements, to identify representative maximum noise levels. CRN only considers average noise levels over daytime or night-time periods, so noise surveys were necessary to provide suitable data for the assessment of maximum noise levels.

1.3.8 The properties affected by noise from rail movements were aggregated according to the noise level to which they were predicted to be exposed, and a conclusion reached as to the overall effect of the project's use of rail freight.

1.3.9 The potential for the railway noise assessment to develop and further consider certain types of residential accommodation was noted in **paragraph 1.6.6 of Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)], which stated:

'In reviewing the potential noise levels we have undertaken research to identify the number of properties which may be impacted: estimated numbers of properties affected are as shown in Table 1.9 below. These numbers will continue to be reviewed including, where relevant, permanent residential caravans and houseboats identified.'

- 1.3.10 **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546] summarised the number of properties anticipated to fall into bands of noise levels that equated to magnitudes of impact. **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546] is replicated here as **Table 1.1**.

Table 1.1: Estimated numbers of properties exposed to different noise levels from proposed night time use of the East Suffolk line between Saxmundham and Westerfield junction

Noise level, L_{AFmax} , dB (free-field)	Estimated number of dwellings	
	No mitigation	Mitigation (no stops in Saxmundham)
60-70 ⁽¹⁾	390-410	320-350
70-77	150-160	100-110
Over 77	40-50	5-10

Note: ⁽¹⁾ **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546] erroneously labelled this row as “60-79”; “60-70” is correct.

- 1.3.11 Updates to this table are included in this supplemental assessment, where necessary.
- 1.3.12 This supplemental assessment considers the potential noise effects from the use of the rail infrastructure for houseboats along the River Deben in Woodbridge and Melton, as anticipated in **paragraph 1.6.6** of **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [APP-546].
- 1.3.13 This supplemental assessment has been undertaken following formal and informal representations made to SZC Co. by Woodbridge Town Council and East Suffolk Council.
- 1.3.14 Only airborne noise from operational trains is considered in this supplemental assessment as the houseboats are either too far from the railway line to be significantly affected by groundborne noise or vibration, or are disconnected from the land in such a way that the transmission of groundborne noise or vibration will be greatly reduced.
- 1.3.15 No substantive construction works are proposed close to the houseboats, so construction noise or vibration is not considered either. It is possible that there will be rail replacement along sections of the East Suffolk line, some of which falls under Network Rail’s regular maintenance programme, and some that are brought forward by SZC Co. All such works would be undertaken by Network Rail and are considered to be routine maintenance rather than substantive construction works.

- 1.3.16 SZC Co. has committed to two key mitigation schemes that are relevant to this supplemental assessment of railway noise and vibration:
- The ‘Noise Mitigation Scheme’ (**Volume 2, Appendix 11H** of the **ES** (Doc Ref 6.3) [[APP-210](#)]).
 - The ‘Rail Noise Mitigation Strategy’, set out in draft in **Volume 3, Appendix 9.3.E** of the **ES Addendum** (Doc Ref 6.14) [[AS-258](#)].
- 1.3.17 The ‘Noise Mitigation Scheme’ will provide the means to improve the sound insulation of those properties that meet certain qualifying criteria. For railway noise, the criteria are:
- A. an offer for noise insulation based on averaging rail noise over the day and night time periods, which is consistent with the national Rail Noise Regulations.
- (i)(a) the Future (Rail) Noise Levels exceed façade noise levels of 69dB $L_{Aeq,16hrs}$ during the hours of 07:00 to 23:00 or 58dB $L_{Aeq,8hrs}$ during the hours of 23:00 to 07:00;
 - (b) the Future (Rail) Noise Levels are at least 1dB higher than the Existing (Rail) Noise Levels as a result of the use of the new or amended railway line associated with the Development; and
 - (c) the contribution from the new or amended railway line associated with the Development to the Future (Rail) Noise Levels at the façade is at least 1dB; or
- B. an offer for noise insulation based on the max noise level created at night:
- (ii) maximum sound level L_{AFmax} 73dB between 23:00 and 07:00 hours.
- 1.3.18 The same criteria are applied to noise resulting from SZC construction trains irrespective of whether they use existing rail lines or new / altered rail lines.
- 1.3.19 It should be noted that the 73dB façade L_{AFmax} threshold has been amended from the 80dB façade L_{AFmax} value originally set out in **Volume 2, Appendix 11H** of the **ES** (Doc Ref 6.3) [[APP-210](#)] as a result of discussions with the local planning authorities. The mitigation package has been strengthened in this respect.

1.3.20 The measures set out in the draft 'Rail Noise Mitigation Strategy' (**Volume 3, Appendix 9.3.E** of the **ES Addendum** (Doc Ref 6.14) [[AS-258](#)]) include:

- Installation of a crossover north of Saxmundham station and upgrades to the signalling system to permit trains to join or leave the Saxmundham to Leiston branch line without stopping, known as the 'change arrangements at Saxmundham'.
- The Saxmundham to Leiston branch line will be upgraded with a refurbished trackbed, concrete or steel sleepers, and welded rails to provide a consistent rail cross-section consistent gauge, and smooth running surface.
- The proposed rail extension route will be constructed using the same approach as the upgraded Saxmundham to Leiston branch line.
- Under ballast mats will be installed where the Saxmundham to Leiston branch line or proposed rail extension route pass within 15 metres of a residential receptor, and will be installed for a minimum of 10 metres either side of the property. An alternative design may be substituted, if its effectiveness is equal and approved.
- Night-time speed limits of 10 mph will apply at three locations along the East Suffolk line: Woodbridge/Melton, Campsea Ashe, and Saxmundham.
- Speed on the Saxmundham to Leiston branch line will be limited to 10mph during the early years.
- Pending the results of further assessment of the upgraded and mitigated Saxmundham to Leiston branch line during the early years operation, the speed limit on Saxmundham to Leiston branch line may be increased to 20mph. This further assessment work is described later in this section.
- The speed limit on the proposed rail extension route will match that applied to the Saxmundham to Leiston branch line. This enables constant train speeds to be maintained, thereby avoiding accelerating locomotive noise close to the north-western corner of Leiston.
- Class 66 locomotives will be used in preference to Class 68 locomotives, where there is equivalent choice.

- Night-time construction trains will not travel into or out of Leiston, instead being held on the Saxmundham to Leiston branch line to the west of the Saxmundham Road level crossing, at defined locations.
- Construction trains stabled overnight on the branch line will not be permitted to keep their engines idling.

1.3.21 The majority of these measures relate to the Saxmundham end of the railway line, however, the speed limit in Woodbridge and the selection of quieter locomotives are relevant beyond this area and to this supplemental assessment.

2 ASSESSMENT CRITERIA

- 2.1.1 As set out in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)], the EIA methodology considers whether impacts from the proposed development would have an effect on any resources or receptors. The assessment broadly considers the magnitude of impacts and the value/sensitivity of resources/receptors that could be affected to classify effects.
- 2.1.2 The effect of noise and vibration on a receptor or community is dependent on the magnitude of the impact, the sensitivity of the receptor, and may also depend on other factors, such as the existing acoustic environment.
- 2.1.3 A detailed description of the assessment methodology used to assess the potential effects on noise and vibration arising from the proposed development is provided in **Volume 1, Appendix 6G** of the **ES** (Doc Ref 6.1) [[APP-171](#)].
- 2.1.4 The assessment criteria for airborne railway noise that are relevant to this supplemental assessment are summarised in this section.

2.2 Receptor Sensitivity

- 2.2.1 The criteria used to determine the sensitivity of potentially affected receptors are set out in **Table 2.1**.

Table 2.1: Assessment of the value or sensitivity of receptors for noise and vibration

Sensitivity	Description
High	Receptors that are highly sensitive to noise or vibration such as theatres, auditoria, recording studios, concert halls and highly vibration sensitive structures or uses such as certain laboratories medical facilities or industrial processes.
Medium	Noise and vibration sensitive receptors such as permanent residential buildings, hospitals and other buildings in health/community use, buildings in educational use, hotels and hostels.
Low	Receptors with limited sensitivity to noise and vibration such as offices, libraries buildings in religious use, and other workplaces with a degree of sensitivity due to the need to concentrate.
Very Low	Receptors of very low sensitivity to noise and vibration such as industrial or commercial buildings and transient or mobile receptors.

- 2.2.2 These same criteria have been used for the assessment set out in this supplemental assessment. Residential accommodation is considered to be medium sensitivity, including for houseboats.

2.3 Impact Magnitude

- 2.3.1 The magnitude of impact as a result of airborne railway noise was assessed by applying different criteria, according to the existing level of rail service along a particular rail line.
- 2.3.2 For the East Suffolk line, with its regular, predominantly passenger-based service, it was the change in noise level from the existing situation that was used to quantify the magnitude of impact.
- 2.3.3 For new lines, or lines that are to be brought back into regular service, as would be the case for the Saxmundham to Leiston branch line and green rail route, absolute criteria were derived from noise policy and guidance, to correlate with a particular magnitude of impact.
- 2.3.4 For night-time rail movements, the maximum noise levels associated with the peak of noise from passing trains were assessed against absolute criteria, again, derived from noise policy and guidance, to correlate with a particular magnitude of impact.
- 2.3.5 As was noted in Section 1 of this supplemental assessment, the change in noise level along the East Suffolk line during the daytime was found to be negligible, as a result of a single freight train being run in addition to the regular passenger service.
- 2.3.6 During the night-time, changes in the average night-time noise levels were found to be significant in some locations, as a result of the additional night-time freight movements being added to the current night-time rail movements, which are limited.
- 2.3.7 It was found that the maximum sound levels from individual passing trains were the most significant indicator when determining the magnitude of impact. Wherever a significant adverse effect was found to have occurred as a result of the change in the overall night-time noise level, maximum noise levels from passing trains also gave rise to a significant adverse effect, which was generally more acute.
- 2.3.8 On the basis of these previous outcomes, this supplemental assessment therefore only considers the maximum noise levels from passing trains, and only those criteria relevant to maximum noise levels are set out here.
- 2.3.9 The maximum noise level criteria, which relate to the L_{AFmax} noise index, are set out in **Table 2.2**. The L_{AFmax} values in **Table 2.2** are extracted from **Table 4.7** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)].

Table 2.2: Maximum noise level thresholds to determine the magnitude of impact from rail movements (all values are free field).

Sensitivity of receptor	Period	Magnitude of impact				Parameter
		Very low	Low	Medium	High	
Medium	Night	<60	60	70	77	L _{AFmax} , dB

2.4 Application of Maximum Noise Level Thresholds to Houseboats

2.4.1 Maximum noise levels are the most commonly-used measure of sound when considering sleep disturbance, and it is in that context that they informed the assessment of railway noise and the magnitude of impact criteria in **Table 2.2**.

2.4.2 Guidance on sleep disturbance generally relates to sound levels within properties, where people are most likely to be sleeping. The thresholds in **Table 2.2** are external measures of noise, i.e. they are to be measured or calculated at a point outside of a property within which people may be sleeping.

2.4.3 This is the normal approach in noise assessments, since the noise can be measured outside the property without requiring access into a property, which might potentially disturb the occupants.

2.4.4 However, since the thresholds are defined outside the property, but the effect occurs within the property at known noise levels, the difference between the sound levels inside and outside the property is critical. A full explanation of the derivation of the values set out in **Table 2.2** can be found in **Sections 3.2 and 3.3 in Volume 3, Appendix 9.3.D of the ES Addendum** (Doc Ref 6.14) [[AS-257](#)].

2.4.5 In the context of this supplemental assessment, it is useful to understand how those values were derived, in broad terms, so that the appropriateness of the criteria for houseboats can be determined.

2.4.6 The World Health Organisation's (WHO) 'Guidelines for Community Noise' [Ref 2] indicates that people sleeping may be disturbed when the internal noise levels exceed 45dB L_{AFmax} 10 to 15 times per night. SZC Co. has adopted a precautionary approach to the assessment of night-time railway noise and, rather than apply the '10 to 15 times' part of the WHO guidance, SZC Co. has instead worked on the basis that the potential sleep disturbance could occur as a result of a single occurrence of noise above 45dB L_{AFmax} inside the property.

- 2.4.7 It is known that a partially open window in a typical house will reduce external noise levels by approximately 15dB; this reduction is based on the proportion of the external façade that is made up by the partially open window relative to the amount of brickwork.
- 2.4.8 The ‘low’ magnitude of impact is considered to occur where the external noise level exceeds 60dB L_{AFmax} , which is derived from the 45dB L_{AFmax} internal WHO threshold, allowing for the 15dB reduction through a partially open window, i.e. 45dB + 15dB = 60dB.
- 2.4.9 At the other end of the scale, research by Rice and Morgan [Ref 3] and Basner et al [Ref 4, Ref 5] suggests that there is likely to be a significant adverse effect on health and quality of life where the external maximum noise level exceeds 80 or 85dB L_{AFmax} , depending on the number of events. These external values relate to an internal level in the region of 65dB and, again, assume a partially open window.
- 2.4.10 SZC Co. has adopted the more stringent interpretation of the research on a precautionary basis. The 80dB L_{AFmax} value is a façade value, measured 1m in front of the building façade, which is generally 3dB higher than the value that would occur at the same location if the building were not present. The difference is caused by sound reflecting off the building façade, effectively doubling sound pressure level at a point 1m in front of the building; a doubling of the sound pressure causes a 3dB increase in level, as noise is measured on a logarithmic scale.
- 2.4.11 The ‘high’ magnitude of impact in **Table 2.2** is a free-field value, which is a value measured away from any reflecting surfaces other than the ground, and is therefore 3dB lower than the façade level, i.e. 77dB instead of 80dB.
- 2.4.12 The ‘medium’ magnitude of impact in **Table 2.2** is the only value that is not based on the assumption that a window is partially open. It is derived from the same 45dB L_{AFmax} internal noise level that the WHO suggests marks the onset of sleep disturbance, but the correction applied to obtain an external noise level is based on a closed double-glazed window, which will typically reduce external noise levels by 25dB.
- 2.4.13 The important point in the context of this supplemental assessment is that if the sound reduction provided by the external fabric of houseboats is less than 25dB, for example as a result of the use of lighter materials than are typically used in housebuilding, then an impact equivalent to the medium magnitude of impact could occur at a lower external noise level than the 70dB stated in **Table 2.2**.

- 2.4.14 The implications for the assessment of the sound reduction provided by the external fabric of houseboats being less than 25dB are considered later in this supplemental assessment.

2.5 Classification of Effects

- 2.5.1 Following the classification of the magnitude of the impact and the value/sensitivity of the receptor/feature, the effect has been classified as shown in **Table 2.3** (originally **Table 4.11** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]).

Table 2.3: Classification of effects.

		Value/Sensitivity of Receptor			
		Very Low	Low	Medium	High
Magnitude	Very low	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Minor	Minor	Moderate
	Medium	Minor	Minor	Moderate	Major
	High	Minor	Moderate	Major	Major

- 2.5.2 Definitions of each of the different levels of effect, which can be adverse, beneficial or neutral are shown in **Table 2.4** (originally **Table 4.12** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]).

Table 2.4: Effect definitions

Effect	Description
Major	The noise causes a material change in behaviour attitude or other physiological response. Adverse change may result in the potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished or improved due to change in acoustic character of the area.
Moderate	Effects that may result in moderate changes in behaviour, attitude or other physiological response. Adverse effects may result in some reported sleep disturbance. Changes to the acoustic character of the area such that there is a perceived change in the quality of life.
Minor	Effects that may result in small changes in behaviour attitude or other physiological response. Adverse effects may result in some minor reported sleep disturbance. Small changes to the acoustic character of the area such that there is a low perceived change in the quality of life.
Negligible	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.

2.5.3 Following the classification of an effect as detailed in **Tables 2.3** and **2.4**, a clear statement has been made as to whether the effect is ‘significant’ or ‘not significant’ in terms of the EIA Regulations [Ref 6]. As a general rule, major and moderate effects are considered to be significant and minor and negligible effects are considered to be not significant.

2.6 Use of LOAEL and SOAEL values in the assessment

2.6.1 In line with the ‘National Policy Statement for Energy’ (NPS EN-1) [Ref 7] and the ‘Noise Policy Statement for England’ (NPSE) [Ref 8], levels for the lowest observed adverse effect on health and quality of life (LOAEL) and the significant observed adverse effects on health and quality of life (SOAEL) have been established for the assessment of railway noise. **Table 2.5** sets out broad descriptions of these categories, and the actions required for each.

2.6.2 **Table 2.5** was originally **Table 4.13** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)].

Table 2.5: Generic effect descriptions and recommended actions

Effect	Description	Action
Below LOAEL	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No specific measures required.
Between LOAEL and SOAEL	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Mitigate and reduce to a minimum.
Above SOAEL	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Avoid

2.6.3 The LOAEL and SOAEL values for railway noise that are relevant to this supplemental assessment are set out in **Table 2.6** (extracted from **Table 4.16** in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]).

Table 2.6: LOAEL and SOAEL values for railway noise (all free-field values)

Time Period	LOAEL	SOAEL
Night (23:00-07:00)	60dB L _{AFmax}	77dB L _{AFmax}

- 2.6.4 The derivation of these values is detailed in **Volume 1 Appendix 6G** and **Annex 6G.1** of the **ES** (Doc Ref 6.1)) [\[APP-171\]](#), with further detail set out in **Volume 3, Appendix 9.3.D** of the **ES Addendum** (Doc Ref 6.14) [\[AS-257\]](#). The LOAEL and SOAEL values match the ‘low’ and ‘high’ magnitudes of impact, respectively.

3 MODIFICATIONS TO THE NOISE MODELLING

- 3.1.1 As noted in Section 1 of this supplemental assessment, the assessment of railway noise and vibration was set out in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)], including its associated **Appendix 4B** (Doc Ref 6.10) [[APP-546](#)], with the derivation of the assessment methods and criteria set out in **Volume 1, Appendix 6G** of the **ES** (Doc Ref 6.1) [[APP-171](#)].
- 3.1.2 Additional noise surveys and assessment work carried out over the summer and autumn of 2020 modified the way in which railway noise, and in particular vibration, were assessed. The updated assessment was presented in **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)] and its associated appendices in **Volume 3, Appendices 9.3.A to 9.3.E** in the **ES Addendum** (Doc Ref 6.14) [[AS-257](#) and [AS-258](#)].
- 3.1.3 This supplemental assessment further considers the potential effects on houseboats along the River Deben in Woodbridge and Melton where residential accommodation exists in the form anticipated in paragraph 1.6.6 of **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)].
- 3.1.4 This section identifies the modifications or refinements made to the noise modelling process for this supplemental assessment.

3.2 Source Data

- 3.2.1 The source data used in this supplemental assessment are the same as were used previously in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)]. As was noted in **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)], the additional noise survey and assessment work carried out over the summer and autumn of 2020 suggested that the L_{AFmax} levels used in the original noise modelling were higher than were likely to occur in practice.
- 3.2.2 Notwithstanding this, the original, higher values were retained to present a robust assessment, and these values have been used again here.
- 3.2.3 The height of the source assumed in the L_{AFmax} calculations has been modified as a result of the additional survey and assessment work undertaken over the summer and autumn of 2020.
- 3.2.4 The original noise calculations presented in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)] were based on the effective height of the source being either at rail level for locomotives not on full power, or at a height of 4m above rail level for locomotives on full power. These source

heights are specified in the 'Calculation of Railway Noise' (CRN) [Ref 1]. For clarity, locomotives will tend to operate on full power when accelerating.

3.2.5 The additional survey and assessment undertaken over the summer and autumn of 2020 suggested that the effective source height for a locomotive not operating on full power was between 2 and 3m above rail level, not at rail level; the source of peaks of noise appearing to come from the side of the locomotive, not from close to the wheels, as suggested in CRN.

3.2.6 On the basis of this additional information, the source height used in this supplemental assessment was either 4m above rail level for locomotives operating on full power, or 3m above rail level for locomotives not operating on full power.

3.3 Other Modelling Updates

3.3.1 Since this supplemental assessment focuses on a discrete area adjacent to the railway line, higher resolution topographical and building height data have been incorporated into the noise modelling software, and the noise contour plots have been calculated at a higher resolution.

3.3.2 Based on a visual inspection of the area, significant reflecting and screening structures have been included in the noise modelling software, such as, for example, the flood defence wall that runs along part of the boundary between the marina at Woodbridge and the railway line.

3.3.3 The potential sound reduction provided by the external fabric of the houseboats has been estimated using professional judgment and publicly available information; no sound insulation tests have been undertaken to determine the actual sound reduction performance of the external fabric of individual houseboats.

3.3.4 To account for the lower height of the receptors considered in this supplemental assessment, all of the modelling uses a receptor height of 1.5m above ground level, as opposed to the 4.5m above ground level in **Volume 9, Chapter 4** of the **ES** (Doc Ref 6.10) [[APP-545](#)] and **Volume 1, Chapter 9** of the **ES Addendum** (Doc Ref 6.14) [[AS-188](#)].

4 NOISE ASSESSMENT

4.1 Background Information

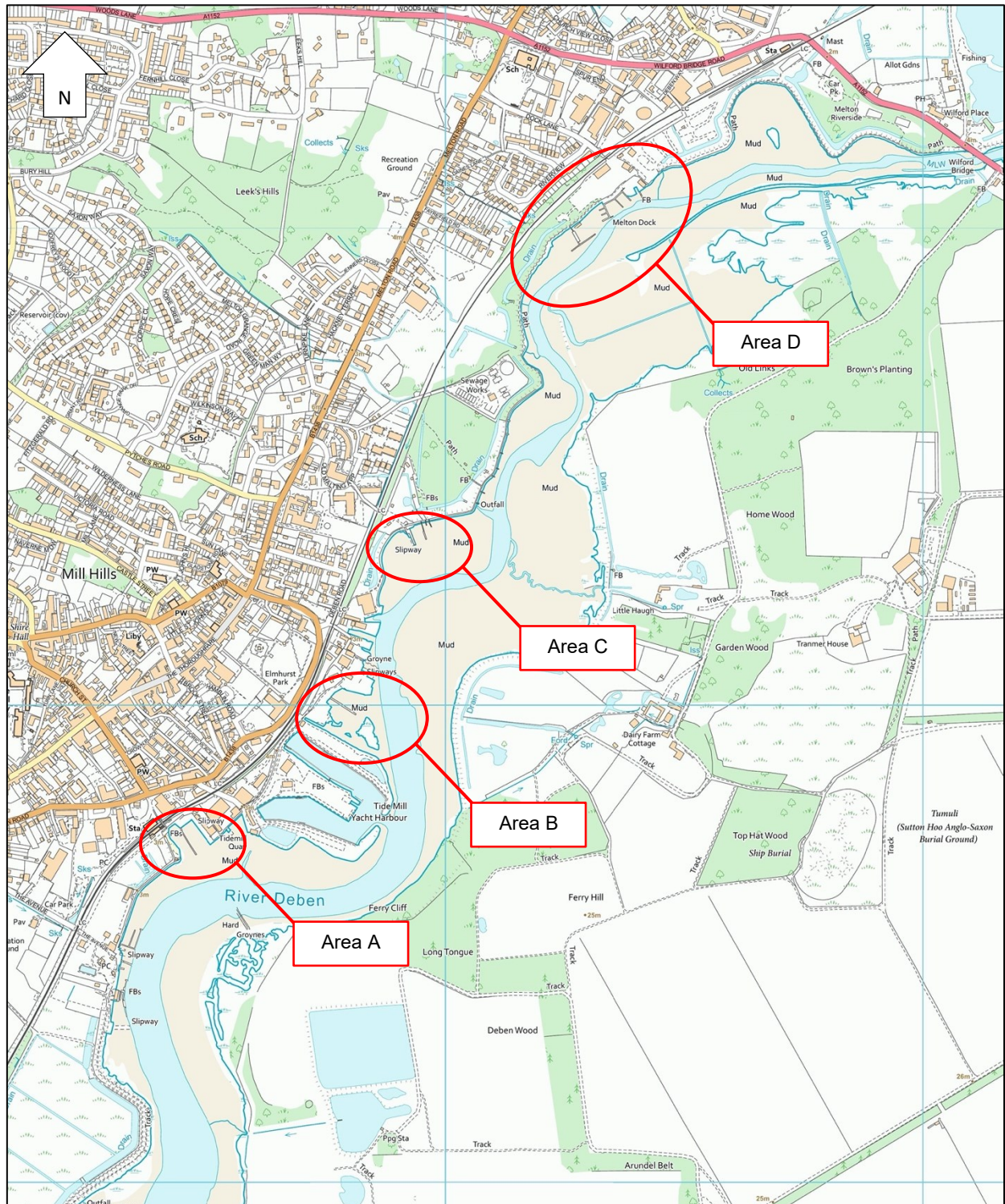
4.1.1 Four areas have been identified along the River Deben in Woodbridge and Melton where there may be houseboats that could potentially be affected by train noise. The four areas are referred to in this supplemental assessment as Areas A, B, C and D, and are shown in Plate 4.1.

Plate 4.1: Locations of houseboats on the River Deben



4.1.2 The wider geographical context of these areas is shown in Plate 4.2.

Plate 4.2: Geographical context for mooring locations



-
- 4.1.3 Although there are known to be other locations where houseboats are moored, they are further from the railway line than the four locations identified here, and therefore likely to be exposed to lower noise levels.
- 4.1.4 Of the four identified areas, Area A has both the most houseboats, and the houseboats that are closest to the rail track. A visual survey of this area was conducted in March 2021 to establish the range and number of boats present at that time.
- 4.1.5 The visual survey suggested that there were approximately 42 no. boats in Area A, of which 14 no. had wooden hulls, 24 no. steel hulls, and four were made from glass reinforced plastic (GRP).
- 4.1.6 It is recognised that the precise numbers of GRP boats could vary, but it is understood that there is not a large turnover in boats, and in any event, the assessed noise levels and mitigation measures would apply to any additional GRP boats.
- 4.1.7 The construction and design of the boats appears to reflect the ages of the boats. There were very few boats that appeared to be under 10 years old, with most appearing to be between 30 and 100 years old, and some potentially older. The boats ranged from modern GRP narrow boats to steel and wooden Thames and Dutch sailing/motor barges.
- 4.1.8 The condition of the boats also appeared to vary; some appeared to be luxurious and in good condition, while others appear to be in varying states of disrepair.
- 4.1.9 The sound reduction performance that could be expected from the external fabric of the boats is likely to vary depending on the type of boat, its construction, i.e. whether made from wood, steel or GRP, the amount of glazing, which ranged from small, fixed portholes to large, openable skylights, and its condition.
- 4.1.10 The more modern GRP boats had large, openable windows, while others, some of which are understood to be designed for longer passages over open water, had fixed portholes. The accommodation within the Thames and Dutch barges is generally deep within the hull with no windows and ventilation only via cowl type vents.
- 4.1.11 An estimate can be provided of the range of likely sound reduction performances from the external fabric of the houseboats observed during the visual survey in March 2021. For the modern narrow boats with large, openable windows, the sound reduction may be as low as 15dB; the steel and older wooden boats, both of which have substantial hulls and

superstructures and small, often fixed, portholes, are likely to have a sound reduction of at least 25dB.

4.2 Assessment Criteria

4.2.1 The majority of houseboats that appeared to be occupied when observed in March 2021 were of steel and wood construction, and a sound reduction performance of at least 25dB R_w for these is considered likely.

4.2.2 This is the same sound reduction performance as would be expected from a typical double-glazed window when closed, as was used in the original noise assessment to derive the external 70dB L_{AFmax} sound level that denoted a medium impact from the internal 45dB L_{AFmax} threshold.

4.2.3 On the basis that the external fabric of the majority of observed boats are considered likely to have a sound reduction of at least 25dB, the same magnitude of impact categories as set out in **Table 2.2** can be used for them.

4.2.4 The LOAEL and SOAEL values were based on a lower sound reduction through an open window of 15dB, and it is considered that these values will remain broadly valid for houseboats as the sound reduction provided by their external fabric is likely to be at least 15dB.

4.2.5 Based on the same criteria as were used in the DCO application, as summarised in Section 2 of this supplemental assessment, the assessment presented here therefore accounts for the potential noise effects for the majority of the houseboats visually surveyed in March 2021.

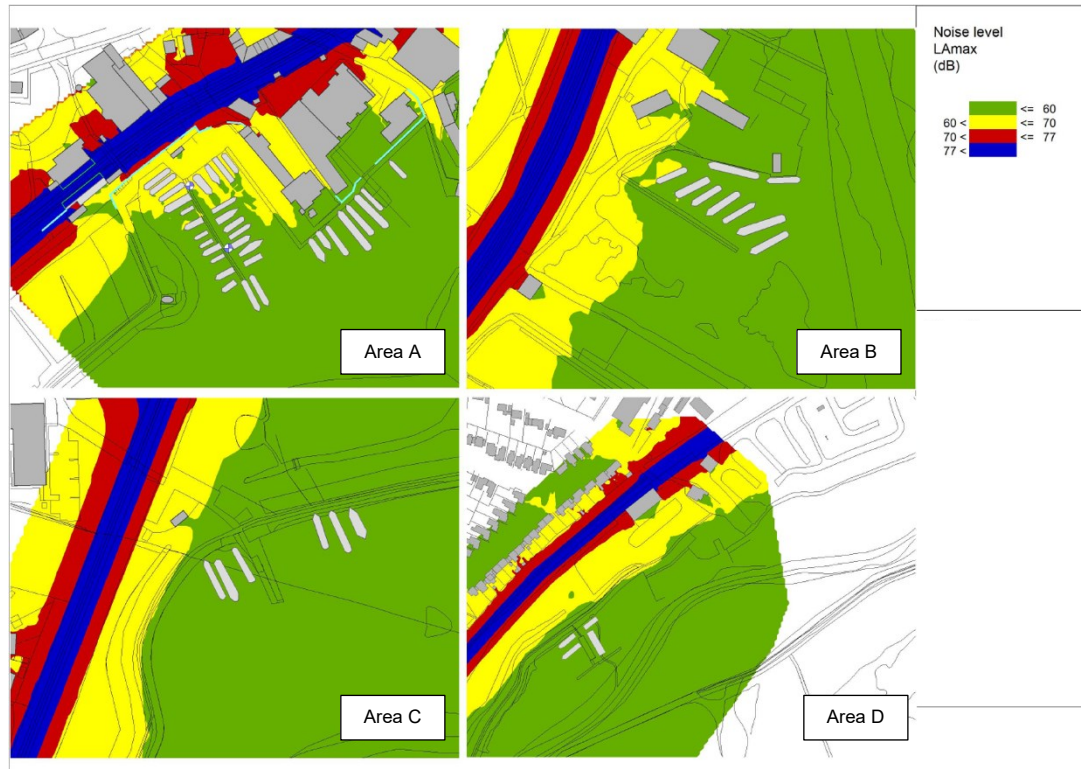
4.2.6 Where houseboats have a sound reduction performance lower than 25dB, which may be the case for GRP-based boats with large, openable windows, a medium magnitude impact, which is considered significant in terms of the EIA Regulations, may occur at an external level of between 60dB and 70dB L_{AFmax} ; the exact threshold at which the significant effect will occur will depend on the precise sound reduction performance of the individual boat.

4.3 Predicted Noise Levels

4.3.1 Train noise levels (L_{AFmax}) have been predicted using SoundPLAN 3D noise modelling software, based on the approach described in Section 3 of this supplemental assessment.

4.3.2 The predicted noise contours are shown in Plate 4.3.

Plate 4.3: Noise contours for houseboats on the River Deben



- 4.3.3 From Plate 4.3, it can be seen that the majority of houseboats are expected to be exposed to night-time L_{AFmax} levels below 60dB, i.e. within the green shaded areas. Of those that are predicted to experience noise levels above 60dB (yellow shaded areas), none are predicted to be exposed to noise levels above 70dB (red and blue shaded areas).
- 4.3.4 The magnitude of impact for the majority of houseboats is therefore expected to be either low or very low. For medium sensitivity receptors, these impacts would result in minor adverse, or negligible effects, neither of which are significant in terms of the EIA Regulations.
- 4.3.5 Where houseboats have a lower sound reduction performance than 25dB, medium adverse impacts could occur in the 60-70dB range (the yellow shaded area). As noted previously GRP-based boats are likely to have a lower sound reduction performance as a result of their typically greater areas of glass in their external fabric.
- 4.3.6 For medium sensitivity receptors, this would result in a moderate adverse effect, which is significant in terms of the EIA Regulations.

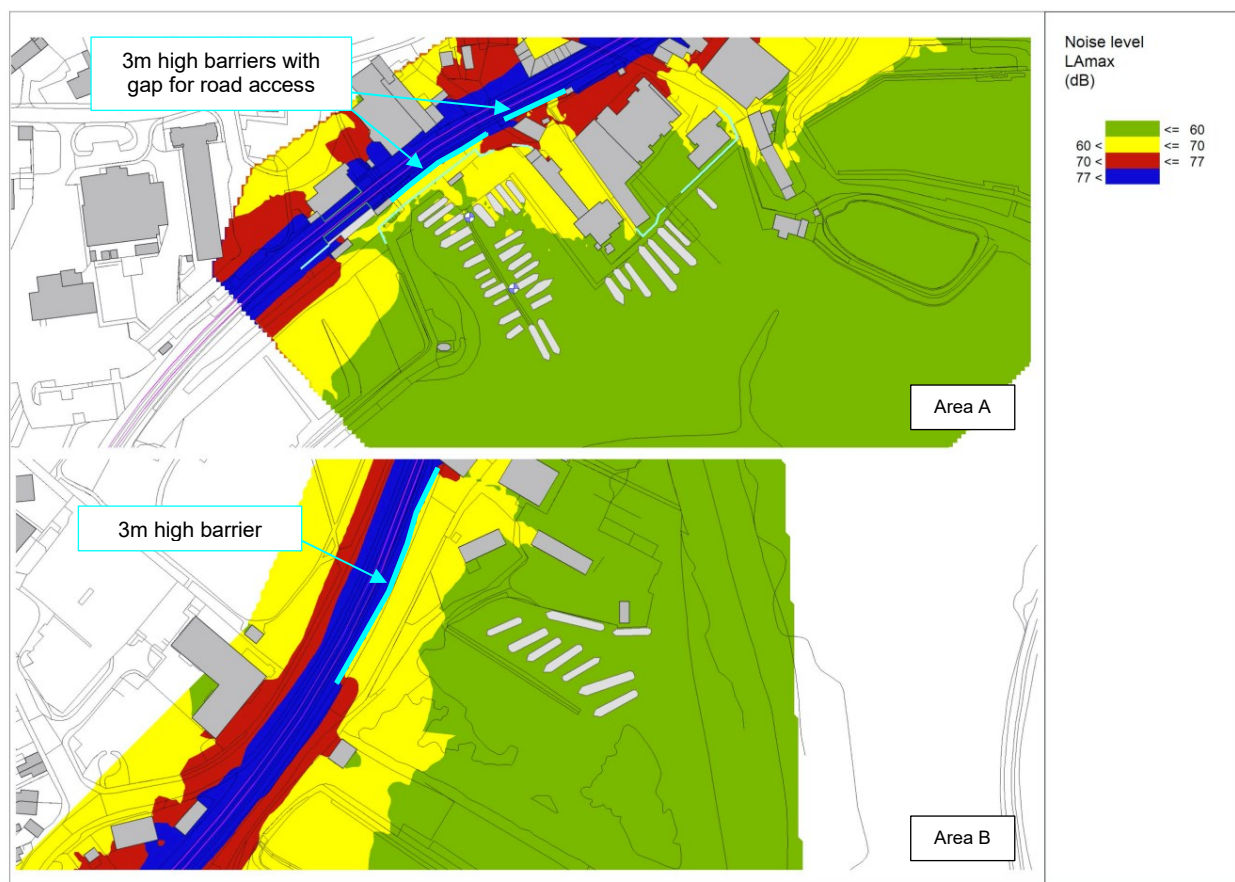
- 4.3.7 For the purposes of this supplemental assessment, it is concluded that significant adverse effects could occur in the 60-70dB L_{AFmax} range (the yellow shaded area), and mitigation is considered accordingly.
- 4.3.8 In all instances, and irrespective of the potential variation in the sound reduction performances of the external fabric of the houseboats, the outcomes fall below the LOAEL, or between the LOAEL and SOAEL. In no case is the SOAEL exceeded.
- 4.3.9 In planning policy terms, the requirement is therefore to mitigate and reduce noise to a minimum. This does not mean such effects cannot occur: the NPSE accepts (paragraph 2.24) that adverse effects that fall between LOAEL and SOAEL can occur and the policy tests can still be complied with.

4.4 Mitigation

- 4.4.1 As noted in Section 1 of this supplemental assessment, the draft 'Rail Noise Mitigation Strategy' (**Volume 3, Appendix 9.3.E** of the **ES Addendum** (Doc Ref 6.14) [[AS-258](#)] sets out the operational and physical mitigation that has been embedded into the operational use of the East Suffolk line.
- 4.4.2 None of the houseboats are predicted to be subject to noise levels of more than 70dB L_{AFmax} , and therefore they would not be eligible for sound insulation under the 'Noise Mitigation Scheme' (**Volume 2, Appendix 11H** of the **ES** (Doc Ref 6.3) [[APP-210](#)]), even as amended.
- 4.4.3 Should there be boats whose external fabric is not capable of providing a sound reduction of 25dB, it is possible that moderate adverse effects could occur in the area predicted to be subject to noise levels of 60 to 70dB L_{AFmax} .
- 4.4.4 SZC Co. therefore proposes to further amend the Noise Mitigation Scheme to make specific provision for a more flexible application of mitigation for houseboats in the Woodbridge and Melton area. The amended Noise Mitigation Scheme will enable improvements to sound insulation to be considered to those houseboats whose external fabric may be acoustically weaker and where such improvements are practicable or feasible, so that the benefits can be provided at a lower noise threshold.
- 4.4.5 The amended scheme will also allow for a wider implementation of mitigation in respect of houseboats than the current glazing and/or ventilation offer. For example, it may be appropriate to offer affected boats air conditioning units, and the cost of operating them, to allow them to keep their windows closed through periods of warm weather.

- 4.4.6 The potential to install acoustic fences along the railway line continues to be explored with Network Rail and further calculations have been undertaken to determine the potential benefit of erecting 3m high acoustic barriers along the East Suffolk line.
- 4.4.7 Acoustic barriers have been considered to screen Areas A and B, as shown in Plate 4.4. Areas C and D are not considered as the boats in those areas are predicted to be exposed to L_{AFmax} noise levels of less than 60dB.

Plate 4.4: Noise contours for houseboats on the River Deben – with mitigation



- 4.4.8 It can be seen from Plate 4.4 that a 3m high acoustic barrier adjacent to the East Suffolk line could be an effective means of reducing noise levels in the most-affected parts of Areas A and B.
- 4.4.9 The L_{AFmax} noise levels in Area B could be brought below 60dB for all houseboats. For Area A, the noise levels would be reduced, but there could still be houseboats exposed to L_{AFmax} noise levels above 60dB. If the boats in those areas have external fabric that does not provide a sound reduction of 25dB, a moderate adverse effect could still occur, which would be a significant effect in terms of the EIA Regulations.

-
- 4.4.10 To be effective, the acoustic barrier would need to be imperforate, sealed at the base, and have a superficial density of at least 18kg/sq.m.
- 4.4.11 Should the discussions with Network Rail confirm that lineside acoustic barriers are feasible, the Noise Mitigation Scheme would be revised to enable delivery of such structures
- 4.4.12 Any such proposals would be subject to discussion with relevant authorities, including East Suffolk Council, Woodbridge Town Council and Melton Parish Council, and local residents, and subject to the necessary permissions and further assessment of other potential environmental effects, prior to any decision whether or not to install any barriers. In any event and as set out above, compliance with policy in terms of the impacts does not depend on the provision of barriers.
- 4.4.13 SZC Co. is willing to consider scope for moving houseboats within the marina, or within the area, if desired by individuals, but given the levels of noise forecast and the potential mitigation options set out here, it is not considered that this measure will be necessary.
- 4.4.14 In terms of planning policy, these outcomes would all fall below LOAEL or between LOAEL and SOAEL. The SOAEL would be avoided in line with policy, and the policy requirement is to mitigate and reduce noise to a minimum.
- 4.4.15 It is therefore necessary to balance mitigation that can be reasonably and practically delivered against reducing the adverse effects on health and quality of life to a minimum, in the context of Government policy on sustainable development.

5 CONCLUSIONS

- 5.1.1 This supplemental assessment provides further information on the potential effects for houseboats along the River Deben that are likely to be exposed to noise from night-time trains associated with the construction of SZC.
- 5.1.2 The assessment shows that none of the houseboats are predicted to be exposed to L_{AFmax} noise levels of more than 70dB. For the majority of boats whose external fabric is likely to provide a sound reduction of at least 25dB R_w , no significant adverse effects in EIA terms are likely.
- 5.1.3 For those boats whose external fabric does not provide a sound reduction of 25dB R_w , significant effects are possible at L_{AFmax} noise levels of between 60 and 70dB, the exact threshold depending on the sound reduction performance of the external fabric of the individual boat.
- 5.1.4 In all cases, the outcomes would all fall between LOAEL and SOAEL. As they do not exceed SOAEL, planning policy does not require the effects to be avoided. Rather, policy requires all reasonable steps to be taken to mitigate and minimise those adverse effects on health and quality of life whilst also taking into account the principles of sustainable development, which does not mean that such effects cannot occur (NPSE paragraph 2.24).
- 5.1.5 SZC Co. proposes to revise the Noise Mitigation Scheme to enable a more flexible application of mitigation for houseboats in the Woodbridge and Melton area than is currently possible under the terms of that document.
- 5.1.6 Acoustic barriers along the edge of the East Suffolk line could have a further beneficial effect, and the potential for installation of such barriers continues to be explored with Network Rail. Should Network Rail agree that lineside acoustic barriers are feasible, they will be subject to discussion with relevant authorities. In any event, compliance with policy in terms of the impacts does not depend on the provision of barriers.
- 5.1.7 On the basis of this further assessment, **Table 1.9** in **Volume 9, Appendix 4B** of the **ES** (Doc Ref 6.10) [[APP-546](#)] would be updated as shown in **Table 5.1**. The figures in **Table 5.1** include the additional houseboats considered in this supplemental assessment, plus park homes at Whitearch Park, which have been subject to a similar assessment.

Table 5.1: Updated estimated of numbers of properties exposed to different noise levels from proposed night time use of the East Suffolk line between Saxmundham and Westerfield junction

Noise level, L_{AFmax} , dB (free-field)	Estimated number of dwellings	
	No mitigation	Mitigation (no stops in Saxmundham)
60-70 ⁽¹⁾	424-444	349-379 ⁽²⁾
70-77	152-162	100-110
Over 77	41-51	5-10

Notes:

⁽¹⁾ Table 1.9 in Volume 9, Appendix 4B of the ES (Doc Ref 6.10) [APP-546] erroneously labelled this row as “60-79”; “60-70” is correct.

⁽²⁾ Excludes any benefits from a potential acoustic barrier to screen houseboats in the Woodbridge area

REFERENCES

1. Department of Transport (1995) Calculation of Railway Noise (CRN)
2. World Health Organisation (1999) Guidelines for community noise
3. C.G. Rice and P.A. Morgan (1982) ISVR Technical Memorandum No 623 A Synthesis of Studies on Noise-Induced Sleep Disturbance
4. Basner et al, Aircraft noise effects on sleep: Application of the results of a large polysomnographic field study, Journal of the Acoustical Society of America **119**, 2772 (2006)
5. Basner et al, Single and combined effect of air, road and rail traffic noise on sleep and recuperation, SLEEP 2011; 34(1):11-23 (2011)
6. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (SI 2017 No 572)
7. DECC (2011) Overarching National Policy Statement (NPS) for Energy (NPS EN-1)
8. DEFRA (2010) Noise Policy Statement for England

APPENDIX 23A RESPONSE PAPER - TOURISM EX-ANTE STATED PREFERENCE SURVEYS AND HINKLEY POINT C EVIDENCE

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1 OVERVIEW / INTRODUCTION

1.1.1 The Councils note that (Local Impact Report, Paragraph 26.7):

The Applicant commissioned their own visitor survey from Ipsos/Mori in 2019. The survey used both qualitative and quantitative method to collect and assess visitor attitudes towards visiting the Suffolk Coast area during construction of Sizewell C. Its results almost exactly mirrored those headline results from the 2019 visitor and business energy projects survey commissioned by the Suffolk Coast DMO. Namely there was a forecast 17% reduction in overall willingness to visit which, in the DMO survey, equated to a significant negative economic loss every year during construction.

1.1.2 SZC Co.'s position is that it is inappropriate to use ex-ante stated preference surveys to predict even binary choices, let alone predict outcomes with multiple variables like tourism, or then to use that output to make further assumptions about spend (which is dependent on factors like length and location of stay, demographic etc). The survey commissioned by SZC Co from Ipsos MORI in 2019 expressly did not seek to do this.

1.1.3 Consequently, SZC Co. does not believe that it is appropriate to quantify effects on tourism using any ex-ante perception survey.

1.1.4 **Volume 2, Chapter 9** (Socio-Economics) of the **ES** [\[APP-195\]](#) sets out that engagement with local tourism stakeholders, review of environmental effects and mitigation identified across this ES, and SZC Co.'s understanding of perceived visitor sensitivities based on quantitative survey of previous and potential visitors has identified that without mitigation there is potential for:

- very local effects on businesses and activities where there is a combination of significant residual environmental effects; and
- perception-related effects as a result of sensitivities to different aspects of the Sizewell C Project (the potential for perception of changes to for example traffic, where this is already an influencer on propensity to visit).

1.1.5 The **ES** [\[APP-195\]](#) concludes that, in some locations, times and for some visitors, there is the risk of a minor to moderate adverse effect to arise on factors that contribute to tourist visitor sensitivity (including but not limited to traffic) that has the potential to be significant at the local level, without mitigation in the early years of construction.

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- 1.1.6 Any assessment must necessarily take account of the best understanding of the likely effects of the Project taking account of the latest information from studies within the DCO such as the Transport Assessment, and taking full account of the mitigations proposed, and therefore inherently include a review of 'real' rather than perceived effects, for example in terms of EIA-compliant transport effects assessment.
- 1.1.7 SZC Co. and stakeholders recognise that a Tourism Fund is a reasonable and sensible way to be precautionary about risks, given the strong link between people's certainty of intention and their level of knowledge. The Tourism Fund should be used to promote, enhance and market the area.
- 1.1.8 SZC Co. also considers it much more relevant to look to Hinkley Point C (HPC) for evidence of similar Project effects on tourism – noting that there are differences in the local tourism offer, but on the basis that this is the most comparable example of potential effects. There are helpful lessons to be drawn from HPC about the way in which a pre-development opinion survey has turned out to be a poor indicator of actual effects.

2 SZC CO'S QUANTITATIVE TOURISM SURVEY (IPSOS MORI SUFFOLK COAST VISITORS SURVEY)

- 2.1.1 As set out to the Tourism Working Group when the Ipsos MORI Suffolk coast visitor survey was being developed through engagement, SZC Co. does not believe that the effect of the Sizewell C Project on the tourist economy can be quantified by an ex-ante perception survey. SZC Co. has always been clear that the survey commissioned from Ipsos MORI (**Volume 2, Chapter 9, Appendix 9F** (Ipsos MORI Suffolk Coast Visitors Survey) [[APP-196](#)]) cannot and does not quantify the effect.
- 2.1.2 Rather, SZC Co. commissioned a survey to understand more about the perceptions of people who have either previously visited or intend to visit the area, in order to gain an understanding of the sensitivities that should be tackled to prevent the risk of perceptions of reduced likelihood to visit materialising into an economic effect.
- 2.1.3 Ipsos MORI state in their survey [[APP-196](#)]:
- **Page 1** – *"This survey was designed by Ipsos MORI to provide an evidence base that will help SZC Co. and local stakeholders deliver effective mitigation to avoid or reduce perceptions that may otherwise lead to changes in visitor behaviour"*

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- **Page 1** – “The survey was designed to measure the extent to which the construction phase of Sizewell C might present changes that could be perceived to influence the behaviour of visitors to the Suffolk coast. The survey therefore creates an evidence base to help understand:
 - *Potential and previous visitors’ attitudes to the proposed development.*
 - *Awareness of Sizewell B and Sizewell C.*
 - *Perceptions of key concerns and sensitivities, and how elements of the construction phase of Sizewell C might influence behaviour.*
 - *Views, ideas and suggestions for the potential use of a Tourism Fund that may help to alleviate perceived and real changes to the visitor experience.”*
- **Page 6** – “The survey was not designed to measure or model the impact, financial or otherwise, of the construction of Sizewell C on tourism in Suffolk”

3 EVIDENCE FROM HINKLEY POINT C

- 3.1.1 As set out above, surveys asking tourists whether they would change their hypothetical behaviour in several years’ time are unreliable and cannot be used as a means of estimating impacts on tourism.
- 3.1.2 SZC Co.’s approach to estimating impacts has been guided by actual evidence from the experience of HPC and to align that with surveys to understand the potential causes of an impact in Suffolk.
- 3.1.3 The HPC Examination received a lot of evidence on tourism impacts, including a survey of tourists undertaken on behalf of the local authorities which tried to forecast future impacts in a similar way to the Suffolk Coast DMO survey.
- 3.1.4 As set out above, it is very difficult to draw quantified conclusions from surveys where people are asked to estimate how they would react to a hypothetical situation. This is true generally (and evidenced by the poor predictive power of political polling) and specifically in the case of tourism. In this case, visitors were presented with (necessarily limited) descriptions

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of the impacts that HPC might have and asked what it would mean for their future visits.

3.1.5 The HPC survey told tourists about the project and asked about its likely impact on four features – the natural environment; scenery views and unspoilt countryside; clean, fresh air; and ease of travel/journey. They were then asked how that would affect their future likelihood to visit the area. The survey results suggested that around 10% of future visitors would change their plans and not visit. These responses were then translated by the Councils into a potential loss of £47m in spending and 1,900 jobs.

3.1.6 The Panel did not agree that such a large impact was likely. The final report said:

- Impacts during operation would not be an issue (para 4.125)
- Construction impacts were recognised as a major area of concern raised by some stakeholders who were concerned that the image of Somerset as peaceful/tranquil would be destroyed which would in turn cause irreparable harm and deter both day trippers and overnight visitors (4.126)
- Tourism would not be affected by severe traffic congestion of the type envisioned by Interested Parties and so tourism would not suffer as feared (4.128)
- Nevertheless, it welcomed provision in the Section 106 Agreement for funding to mitigate the potential impact on tourism through tourism officers, information centres, and marketing and promotional activities (4.129)
- Interested parties were concerned that workers would take tourist accommodation and deprive tourists of places to stay (4.136)
- The panel was not convinced this would happen for several reasons (4.137)
 - The price varies across the year and in the summer peak increased prices would deter workers
 - Construction workers would prefer single rooms whereas tourists would want family rooms

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- Demand from workers would generally be restricted to areas that were accessible to site (round the park and rides or bus routes) and so not have a significant impact on availability for tourists

3.1.7 The survey was conducted across five Districts – West Somerset and Sedgemoor (host authorities), and Taunton Deane, South Somerset and Mendip (adjacent authorities). The survey found similar responses on all five districts (approximately 5%) despite the fact that the actual impacts of the project were clearly concentrated in the host authorities. This reinforces the point that these types of survey are poor predictors of behaviour. In the case of HPC, this is backed by evidence of what has actually happened.

3.1.8 Tourism impacts at HPC are monitored by the Socio-Economic Advisory Group (SEAG) and a quarterly dashboard is published on its website. This monitors three Key Performance Indicators (KPIs):

- Visitors recommending Somerset (based on a visitor survey)
- Growth in activity on digital channels (based on use of the Visit Somerset and Visit Exmoor websites and social media platforms)
- Tourism business confidence (based on a business survey)

3.1.9 The latest dashboard (below) shows that, in each case, the KPI is above the baseline level. It also reports on developing issues and concludes:

“No concerns to raise to SEAG at present. All metrics suggest continued growth and development and the tourism business survey shows no detrimental impact on visitor perception or business confidence as a result of HPC.”

Plate 3.1: SEAG Dashboard (Hinkley Tourism Action Partnership) 2019

Ref	KPI	Metric	Baseline	Value	Variance from Previous Report	Owner	Status
1	Visitors Recommending Somerset	1.1 Net promoter score taken from the HTAP Somerset Visitor Survey (Visitors that would highly recommend - scores of 9 or 10, minus detractors - scores of 1-6)	70%	72%	0	WSC/HTAP	
2	Growth on Digital Channels	3.1 Minimum combined average growth % in user 'reach' and 'sessions' over past 12 months across Visit Somerset and Visit Exmoor websites and social media platforms.	10%	18%	-2%	WSC/HTAP	
3	Tourism Business Confidence	2.1 Confidence score taken from HTAP Somerset & Exmoor Business Survey (% of businesses scoring 7-10 = confident or very confident)	35%	46%	0	WSC/HTAP	

3.1.10 HPC has been monitoring what has actually happened to the level of visitor spend and number of jobs in tourism across Somerset. The following tables

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and charts show that, rather than losing £47m and 1,900 jobs, the sector has grown since both the DCO consent and the start of the HPC works.

3.1.11 Quantitative data on change in absolute and proportional employment in tourist-related sectors since 2015 – before HPC's DCO works had started (based on Business Register and Employment Survey, ONS) shows that:

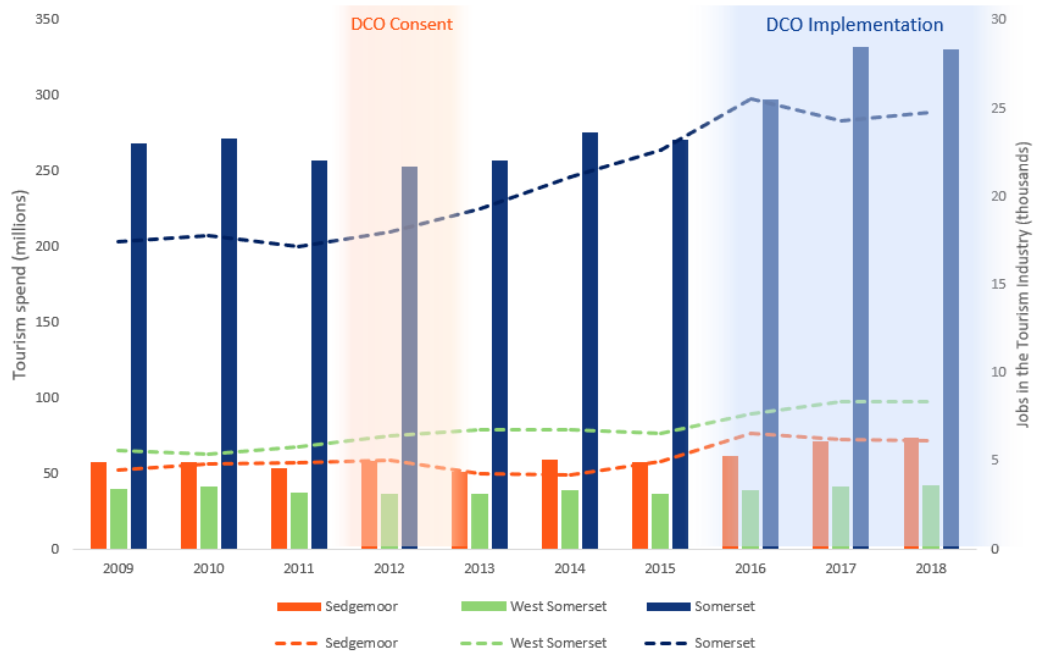
- Absolute employment in tourist sector jobs in West Somerset and Sedgemoor has increased by 1,600 jobs during that time.
- This also translates into an increase in the proportion of all jobs in those areas in the Tourism sector – Sedgemoor's tourist sector grew from 10.5% of jobs to 11.6% of jobs and West Somerset's from 22.1% to 25.2% of jobs.
- Somerset County, and all local districts to HPC (other than Taunton Deane) outperformed national average growth in tourism jobs since nuclear construction begun.
- At a local scale, wards nearest to the construction site have seen a larger increase in tourist-sector jobs when comparing to Somerset as a whole.

Table 3.1: Total and Tourist Sector Jobs (BRES, 2020, ONS)

	2015			2019			Change	
	Tourism	Total	%	Tourism	Total	%	Tourism	Total
Sedgemoor	4,900	46,700	10.5%	6,100	52,400	11.6%	1,200	5,700
West Somerset	3,100	14,000	22.1%	3,500	13,900	25.2%	400	-100
Somerset	23,200	239,000	9.7%	26,700	247,000	10.8%	3,500	8,000
South West	269,800	2,515,000	10.7%	315,400	2,636,500	12.0%	45,600	121,500
England	2,637,100	25,934,000	10.2%	2,907,400	27,153,500	10.7%	270,300	1,219,500

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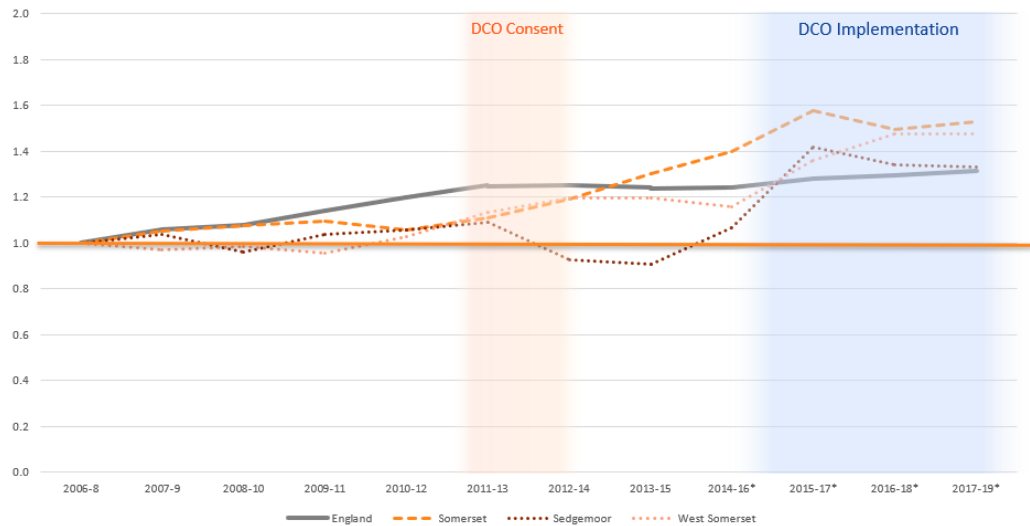
Plate 3.2: Jobs in the Tourism Industry (Line) (BRES, 2020) and Tourism Spend (Column) (GBTS, 2018)



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Plate 3.3: Index of Relative Change in 3-year average Tourism Spend



3.1.12 This may be as a result of the effectiveness of the HPC Tourism Fund applied in Somerset, or because there are no effects. Mitigation measures for HPC via the Tourism Fund have included:

- using public relations support to deliver social media and press campaigns to promote Somerset and Exmoor as destinations;
- providing support for tourism businesses with workshops and networking;
- monitoring business performance and optimism;
- supporting the Destination Management Organisation in Somerset and Exmoor with finance and in-kind expertise; and
- running an advertising campaign focused on target markets and off-peak seasons.

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APPENDIX 23B RESPONSE PAPER - CUMULATIVE EFFECTS (SKILLS AND LABOUR MARKET)

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1 Introduction / Background / Purpose

1.1 Responding to Examining Authority's First Written Questions and Relevant Representations

1.1.1 This Paper provides a response to several questions raised by the Examining Authority (ExA) in the First Written Questions released on 12th April 2021 – these questions are SE.1.15, SE.1.39, CU.1.16, CU.1.17; and CU.1.24.

1.1.2 In responding to these questions, SZC Co. notes that, in most cases, the ExA has drawn on Relevant Representations raised by Suffolk County Council (SCC) [[RR-1174](#)] and East Suffolk Council (ESC) [[RR-0342](#)].

1.1.3 In response to the above Questions and Relevant Representations, this Paper sets out:

SECTION 2

- a) That SZC Co. recognises the value of the Technical Skills Legacy Study¹ and contributed proactively to it by providing data on skill requirements for the Sizewell C Project, but notes that its scope is necessarily different from the scope of an EIA-led cumulative impact assessment in terms of selection of plans, projects and programmes, considering each project that SCC identify against the scope of Sizewell C's assessment of cumulative effects.

SECTION 3

- b) That the assessment of cumulative effects on the regional labour market are considered within **Volume 10**
- c) (Project-wide, Cumulative and Transboundary Effects), **Chapter 4** (Assessment of Cumulative Effects with Other Plans, Projects and Programmes), **Section 4.3** (Socio-economics) [[APP-578](#)], and that this is based on a list of projects determined through the application of EIA regulations, which has been agreed with SCC and ESC.
- d) Further detailed assessment of cumulative schemes to provide an assessment (where possible) of:

¹ Pye Tait Consulting (2020) The Technical Skills Legacy for Norfolk and Suffolk

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- (i) Updated timescales for the delivery of EA3 in particular and any other infrastructure projects where assumptions may have materially changed since submission of the DCO for the Sizewell C Project;
- (ii) Illustrative consideration of schemes that were not included within the original assessment as a result of their location, but where overlapping labour market demand is feasible; and
- (iii) Consideration of different skillsets needed over time from the regional labour market for cumulative schemes.

SECTION 4

- e) How mitigation has been developed (and will be secured within the Sizewell C **Draft Deed of Obligation** (Doc Ref. 8.17(C)) to contribute towards the wider effects of labour / skills demand on the regional workforce from other infrastructure construction projects, acknowledging that all other NSIPs also have their own mitigation packages for employment, skills and education.

1.1.4 This Paper provides clarification on the approach to assessment of cumulative effects related to skills and labour market set out in **Volume 10, Chapter 4, Section 4.3** [\[APP-578\]](#), and summarises that the proposed scope of the original assessment is appropriate, and that the provision of additionally granular information related to skills results in no change in significance compared to the original assessment.

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2 **Consideration of Technical Skills Legacy Study (TSLS) (Pye Tait)**

2.1 **Introduction / Summary**

2.1.1 The TSLS was published in 2020 with collaboration from EDF Energy and other regional stakeholders. It was not available at the time SZC Co. was preparing and submitted the Environmental Statement.

2.1.2 The purpose of the TSLS was to review and advise upon the technical skills legacy in Suffolk and Norfolk deriving from the large scale infrastructure projects coming on stream over the next fifteen years.

2.1.3 The object was to identify legacy infrastructure skills – those which will be of most value to the counties after their respective infrastructure projects have been completed. At the same time, the researchers were required to model skills demand for relevant skills and to set this demand alongside educational – especially vocational – provision within the counties and nearby.

2.1.4 In summary, the TSLS finds that there is a gross, cumulative demand for 60,000 additional technical staff over the next 15 years. That is that the 'baseline' projection for labour growth will not provide for 60,000 roles over that time, requiring some intervention. This is spread between 14 construction Standard Occupational Classification (SOC) codes and over 15 years (TSLS Annex 2, p 55) – so an average of 4,000 roles per year are additional (though the demand is greatest in early years, tailing off). The TSLS also defines 'legacy roles' – that have "*an enduring and potentially increasing value for Norfolk and Suffolk over the next ten to fifteen years*" (i.e. roles that are currently in demand, and will remain in demand).

2.1.5 The following paragraphs summarise the methodological approach used by the TSLS:

Baseline / Future Baseline

- The TSLS identifies 14 Standard Occupational Classification groups (3-digit) that it considers to closely relate to infrastructure works – this is the 'baseline' for existing jobs in construction.
- The TSLS notes that, in 2020, Norfolk and Suffolk had around 129,000 people working in these SOC groups, which is predicted to rise to 170,000 by 2035. Of the 129,000, around 98,000 are assumed to work in infrastructure jobs.

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- The TSLS uses East of England Forecasting Model (EEFM) and Annual Population Survey (APS), and Construction Industry Training Board (CITB) to predict future 'baseline' for skills.
- The approach broadly projects forward a 1.5% p/a growth rate across the 14 selected SOC groups, split proportionately between those occupational groups depending on their relative share of supply at the moment.
- A base assumption in the model is that the existing Norfolk and Suffolk technical workforce will continue to meet a fundamental level of demand for non-NSIP projects throughout the period.

Additional Demand

- In addition to the baseline above (the demand likely to result from pipeline projects), TSLS then identifies additional or adjusted forecast demand.
- The approach is (broadly) based on use of Glenigan (a database of construction projects) to estimate demand from 1,600 projects including infrastructure, based on their value. Of the planned projects, the proposed building of the Sizewell C new nuclear power station was identified as by far the largest in time, complexity, and financial terms.
- The approach uses the total project value for the infrastructure projects, converts this into annual labour demand using co-efficients for each sector, and breaks this down into the 14 SOC codes to give annual demand.
- The additional demand is added to the baseline 'steady state' growth to calculate the proportion that is not covered by 'steady state' growth.

2.1.6 SZC Co. considers that the TSLS is a helpful and insightful document, and will be a useful tool in planning for skills between the Sizewell C Project and other regional infrastructure projects. It will enable the Sizewell C Project's Workforce Delivery Strategies (WDS) and Annual Implementation Plans (AIP) to be responsive to wider market demand over time, provide a benchmark for monitoring, and could be a useful guide for the regional skills co-ordination function. Additionally, SZC Co.'s WDS and AIPs will be invaluable to the TSLS to provide it with up-to-date, accurate workforce data, in order to better inform the wider TSLS.

2.1.7 SZC Co. notes, however, that the TSLS has some limitations:

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- The use of workforce information for Sizewell C is in some places out-dated and in others incorrect (for example, the TSLS refers to both information from previous stages of consultations that has since been amended, and figures used within the DCO).
- The estimate of project value (from Glenigan) for Sizewell C is incorrect, and does not reflect the estimates for local and regional spend from the overall total in the DCO (see **Economic Statement** [[APP-610](#)]).
- The TSLS does not provide the detailed skills demand estimates for the infrastructure projects (requested by SCC in SZC Co.'s review of cumulative demand). For example, it does not sufficiently determine the Civils and Mechanical, Electrical and Heating (MEH) skillsets for specific infrastructure projects.
- There appears to be a homogenous approach to estimating additional demand across infrastructure projects, based on a proportionate increase in existing employment in selected SOC groups. Any information related to specific skills demand from infrastructure projects is not published with the TSLS.
- Some potentially relevant SOC groups are omitted – including Process Operatives and Skilled Metal, Electrical, Electronic Trade supervisors.
- The TSLS does not take into account the interventions in developing an infrastructure skills pipeline committed to by SZC Co. in its DCO application (because it was developed before the DCO application was submitted), or any other NSIP (all of which have specific skills commitments agreed by Section 106, Section 111 or MoU).

2.1.8 SZC Co. notes that both Sizewell C's cumulative EIA assessment (**Volume 10, Chapter 4, Section 4.3** [[APP-578](#)]), and the TSLS use CITB forecasts and EEFM construction labour forecasts to predict forward baseline growth, and then assess the 'above trend' demand from new infrastructure projects in the region – though the criteria used to determine those projects differs.

2.1.9 In SZC Co.'s view, the conclusion of the TSLS does not change the conclusions of the Sizewell C Project's cumulative effects assessment [[APP-578](#)], rather provides wider and less constrained context for demand for skills across the wider region. The TSLS includes some of the projects that are within scope for the cumulative assessment [[APP-578](#)], but does not include the requisite skills information to contribute to the assessment.

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- 2.1.10 Sizewell C's cumulative assessment **Volume 10, Chapter 4, Section 4.3** [[APP-578](#)], and the TSLS were developed for similar, but different purposes – the former is defined by EIA Regulations and assesses likely significant effects from projects in the planning system, across the Zone of Influence (Zoi) defined by the scale of effects, that would overlap temporally with the Sizewell C Project (based on timescales in planning documents) where they are considered to be in addition to future baseline / trend-based growth.
- 2.1.11 SZC Co. continues to work closely with SCC and ESC in order to plan for potential legacy skills effects and develop the approach to Workforce Delivery Strategies for the Sizewell C Project.
- 2.1.12 Further detail on the difference in scope between the TSLS and SZC Co.'s cumulative assessment [[APP-578](#)], is included in **Section 3.2**.

3 Sizewell C Cumulative Demand for Skills

3.1 Introduction

- 3.1.1 **Section 4.3 of Volume 10, Chapter 4 of the ES** sets out at **Table 4.3** and **Plate 4.2** [[APP-578](#)], a high-level assessment of annual demand for construction and operational employment for Sizewell C and other NSIPs considered in that assessment (East Anglia ONE North, East Anglia TWO and East Anglia THREE). This summarised that:

“Cumulative effects related to the labour market during the construction phase are likely to be no more significant than the effects generated by Sizewell C and reported in Volume 2, Chapter 9 of the ES. Set against the overall regional construction workforce growth projections and labour market slack illustrated on Plate 4.1, the additional effect is likely to be negligible at a regional scale”.

- 3.1.2 This means that the residual effect of the Sizewell C Project on labour demand is not considered significant, and the cumulative schemes add only a negligible additional element, which in the scale of the regional labour market (and since those projects will also have skills mitigation) is not significant.
- 3.1.3 Relevant Representations raised by SCC [[RR-1174](#)] and ESC [[RR-0342](#)] have requested that SZC Co. considers the significance of labour market effects in more detail, including:

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- a) A wider list of potential cumulative projects (based on the TSLS methodology and examples provided by SCC in relevant representations);
- b) A more detailed breakdown of skill demands by phase / work package of the Sizewell C Project compared to other infrastructure projects;
- c) Re-consideration of the effect of East Anglia THREE which, following a non-material amendment to its DCO in Summer 2020, shifted construction back to start in 2022 (meaning it would be complete in 2026 if the overall timescale of the build remains constant).

3.1.4 In order to provide more detail under request (b), set out below is more detail in addition to the information provided within the Environmental Statement, to clarify some assumptions used in the assessment, based on new information from cumulative projects since the submission of Sizewell C's DCO application – namely, that it may be more helpful to consider just the Home-based (HB) element i.e. where there would be an overlap in demand for skills/roles from within similar (if not exactly the same) spatial labour market areas.

3.2 Approach to Cumulative Project selection

3.2.1 SZC Co. is comfortable with the approach to identifying, screening, testing, consulting on and assessing cumulative plans, projects and programmes in-line with the approach set out within **Volume 10** of the **ES**.

3.2.2 **Chapter 1** of **Volume 10** of the **ES** [[APP-572](#)] sets out the selection criteria for inclusion of projects, including the consultation process to agree these. In summary:

- A staged process has been followed to assess cumulative impacts with other plans, projects and programmes as recommended by the Planning Inspectorate's Advice Note 17.
- Non-Sizewell C projects, plans and programmes have been included on the basis that they are either: under construction, permitted, submitted, in screening/scoping phases of planning, or on the National Infrastructure Planning Programme of Projects.
- A long-list of potential cumulative projects has been monitored and updated throughout the pre-application stage up to submission of the DCO application, and any updates and changes have been considered by the assessment process.

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- The long list of identified developments was discussed and agreed with ESC and SCC in April and September 2019. A final review of publicly available information was undertaken in December 2019 to identify any new project, plans and programme submitted since April 2019.
- **Volume 10, Chapter 1 paragraph 1.4.10** [[APP-572](#)] notes that *“Consultation on the approach and scope of the assessment of cumulative effects with other plans, projects and programmes has been undertaken with East Suffolk Council (ESC). Throughout the consultation on the effects with other plans, projects, and programmes, ESC also represented Suffolk County Council (SCC)”*.
- Criteria was applied to the ‘long list’, resulting in ‘short list’ which was shared with Councils for review.
- The approach to selecting cumulative projects was topic-led and based on screening/scoping criteria in-line with EIA regulations to capture likely significant effects from development in the planning system. As such, cumulative projects needed to be at least in planning, across the Sizewell C Project’s Zone(s) of Influence, overlapping temporally with the Sizewell C Project (based on timescales in planning documents), and with sufficient information in the public domain e.g. on labour demand/skills to undertake a consistent assessment.

3.2.3 SZC Co. notes that the scope of the TSLS is not limited by these regulations, and can include any project or plan regardless of public information available on employment effects, planning information, spatial scale etc.

3.2.4 As such, the list of projects differs (understandably) – the TSLS is for skills planning not EIA, so would be anticipated to have a different methodology and scope to the SZC cumulative assessment [[APP-578](#)]. The TSLS is relevant to skills planning, but the cumulative assessment [[APP-578](#)] is more relevant when considering the effects of the Sizewell C Project in EIA terms.

3.2.5 The TSLS provides additional information to help develop the combined position on skills demand and labour market effects – this does not change the conclusions of SZC Co.’s cumulative assessment [[APP-578](#)] but helps to provide wider information about the labour demand across Norfolk and Suffolk which will influence the direction of mitigation.

3.2.6 Cumulative effects are only considered within the regional labour market (or Zone of Influence) for Sizewell C in respect of skills – in this case the

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90-minute commuting area for home-based workers (the Construction Daily Commuting Zone (CDCZ)). As such, the cumulative effects of national infrastructure projects on the regional labour market where projects are located outside of that area are not considered within the cumulative assessment [APP-578], (for example other power stations such as Hinkley Point C, and other NSIPs such as the Lower Thames Crossing and Crossrail 2).

- Cumulative projects can also only be considered where there is sufficient confidence that projects will be delivered, in order to reflect a reliable estimate of the spatial and temporal scale of effects. This means that projects must be in planning or under construction to be considered: As an example, Bradwell B is not currently in planning and therefore does not meet the criteria for consideration as a cumulative scheme, as it does not have a well-defined timeframe for delivery and in any case is not at the stage where material consideration of the effects of the project could be estimated (such as the number and skillset of workers).
- Nonetheless, while not formally considered within the assessment, SZC Co. recognises the potential for Bradwell B to interact with employment, skills and training initiatives should it become a live project in the future and would work in dove-tailing WDS and supply chain measures where practicable.

3.2.7 Where projects are already complete (such as East Anglia ONE), these are inherently included within the background / future baseline (for example where projections take into account trend-based projections including housebuilding). Where projects are ongoing or comprise non-specific frameworks for public sector investment, these have been omitted from the list of additional cumulative projects.

3.2.8 SZC Co. notes that in ESC's Relevant Representation [RR-0342] it is stated that:

"The three applications likely to impact primarily with regards to cumulative impact are: East Anglia One North, East Anglia Two and East Anglia Three offshore windfarms" (paragraph 2.259).

3.2.9 The following table responds directly to Relevant Representations that identify potential projects for inclusion in the cumulative socio-economic assessment within Sizewell C's DCO, providing clarity about the reasons for inclusion/exclusion of projects.

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Table 3.1: Consideration of potential cumulative projects suggested by SCC in Relevant Representations

Project	Comments
East Anglia ONE	Considered part of future baseline – the project will be constructed by the time that the Sizewell C Project's construction phase begins, so no cumulative demand for construction skills.
East Anglia ONE North	Included in cumulative assessment APP-578 - included in further detail in Section 3.3 .
East Anglia TWO	Included in cumulative assessment APP-578 - included in further detail in Section 3.3 .
East Anglia THREE	Included in cumulative assessment APP-578 - included in further detail in Section 3.3 .
Lake Lothing Third Crossing (Gull Wing)	Considered in 'Long List' for cumulative effects – scale and nature of development not considered to have a significant effect, and construction timeline suggests construction phase will end in mid-2023 ² and be unlikely to interact with Sizewell C construction phase. The construction phase is likely to require just 100 FTE workers at peak, and it is not clear that these will all be drawn from the existing local workforce, or how many (Table 16-9 Environmental Statement ³ “ <i>it is likely that some construction workers can be sourced from within the study area</i> ”)
Norfolk Boreas	Considered in 'Long List' for cumulative effects – Boreas not taken forward to 'Short List' (scale and nature of development not considered to have a significant effect). Vanguard considered for 'Short List'. Onshore elements of project are outside of the socio-economic Zol. Included in further detail for illustrative purposes in Section 3.3 .
Norfolk Vanguard	

² <https://gullwingbridge.co.uk/construction/>

³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010023/TR010023-000280-6.1%20-%20Environmental%20Statement.pdf>

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Project	Comments
Peel Ports Great Yarmouth Expansion	Not considered within scope/screening for cumulative assessment, as not in planning.
Kings Lynn (B)	Not considered within scope/screening for cumulative assessment – consent appears to have been granted in 2009, with Section 36C variation in 2018. Outside of socio-economic Zol.
Great Yarmouth Third River Crossing	<p>Not considered within scope/screening for cumulative assessment.</p> <p>SZC Co. notes that the information submitted as part of the DCO (Chapter 14⁴) sets out that:</p> <ul style="list-style-type: none"> - The average HB workforce within 50 miles of Great Yarmouth during the construction period would be 58 FTEs, from Q4 2020 to Q4 2022. - The scale of demand for construction labour would therefore be negligible in terms of the overall labour market, and would in any case be unlikely to overlap with the construction workforce profile of Sizewell C, and would cover a different labour market. <p>As far as can be gathered from public information⁵, construction started in January 2021 and the developer is aiming to have the bridge operational and open to traffic by early 2023, and therefore is unlikely to interact to any great extent with Sizewell C's construction workforce demand.</p>
Nautilus Interconnector	<p>Considered in 'Short List' for cumulative assessment, noting that the project is currently at the scoping stage, and that installation may commence in 2026 with connection in 2028.</p> <p>SZC Co. notes that National Grid have produced a Briefing Pack⁶ (July 2019) which sets out that a planning application is anticipated to be submitted</p>

⁴ [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010043/TR010043-000465-6.1%20Environmental%20Statement%20\(Vol%20I%20Written%20Statement\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010043/TR010043-000465-6.1%20Environmental%20Statement%20(Vol%20I%20Written%20Statement).pdf)

⁵ <https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/great-yarmouth/third-river-crossing>

⁶ <https://www.nationalgrid.com/document/125601/download>

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Project	Comments
	<p>in 2022, with construction to start in 2025 and end in 2028.</p> <p>Beyond this, at this stage there is no information on the scale, location, design or other planning or socio-economic information that would be needed to complete a cumulative assessment of socio-economic effects.</p>
Eurolink Interconnector	<p>Considered in 'Short List' for cumulative assessment, noting that the project is currently at the scoping stage, is undertaking further detailed consideration of siting options and that connection may occur in 2025.</p> <p>Beyond this, at this stage there is no information on the scale, location, design or other planning or socio-economic information that would be needed to complete a cumulative assessment of socio-economic effects.</p>
Greater Gabbard Windfarm Extension (aka North Falls OWF)	<p>SZC Co. notes that an application for development consent is anticipated in 2023⁷, but at this stage there is no information on the scale, location, design or other planning or socio-economic information that would be needed to complete a cumulative assessment of socio-economic effects.</p>
Galloper Windfarm Extension (aka Five Estuaries OWF)	<p>SZC Co. understands that an Agreement for Lease has been signed with Crown Estates (August 2020) for an area for extension of the existing OWF. The project is in its early stages, with operation likely in 2030⁸.</p> <p>The website⁹ for the project states that: <i>Five Estuaries is currently in the early stages of development... it is too early to say what type of turbines or how many will be considered for the Wind Farm... It is anticipated that it will take in the region of ten years to develop and construct the project, prior to it becoming operational.</i></p>

⁷ <https://www.4coffshore.com/news/rwe-and-sse-join-forces-for-greater-gabbard-extension-nid19201.html>

⁸ <https://www.4coffshore.com/news/galloper-partners-secure-agreement-for-lease-for-extension-nid19202.html>

⁹ <https://fiveestuaries.co.uk/>

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Project	Comments
	As such, at this stage there is no information on the scale, location, design or other planning or socio-economic information that would be needed to complete a cumulative assessment of socio-economic effects.
SCD 1 & 2 – National Grid ESO	Domestic interconnectors proposed by National Grid to connect between Kent and a landfall around Sizewell. SZC Co understand that SCD 1 is due to be operational by 2028 ¹⁰ , but at this stage there is no information on the scale, location, design or other planning or socio-economic information that would be needed to complete a cumulative assessment of socio-economic effects.

3.3 Clarification of employment requirements for cumulative projects (Total regional workforce and timescale of demand)

3.3.1 **Table 3.2** sets out, as far as can reasonably be determined by materials in the public domain, the regional employment demand from cumulative NSIPs which have been considered in the Sizewell C DCO application (for illustrative purposes, the Norfolk Boreas and Norfolk Vanguard projects have been added – these projects were scoped out as being on the edge of the socio-economic Zol - and providing an up-to-date timetable of development for pre-assessed projects).

3.3.2 The new construction programmes for East Anglia ONE North, East Anglia TWO and East Anglia THREE, as detailed on the new 'East Anglia Hub'¹¹ website, state that offshore construction of all three schemes will commence in 2023, onshore works will commence in 2024 and all three schemes will be operational by 2026. Information provided by Scottish Power Renewables states that construction is likely to be sequential, with parallel construction being the worst-case scenario.

¹⁰ <https://www.nationalgrideso.com/document/162356/download> (p53)

¹¹ East Anglia Hub is the name for the collective East Anglia THREE, East Anglia TWO and East Anglia ONE North offshore windfarm schemes.

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Table 3.2: Home-based (Regional) FTE Employment (i.e. years of employment required from the regional labour market each year), by Onshore and Offshore, for Wind Energy Projects for Cumulative Assessment

Year	EA ONE (N)		EA 2		EA 3		Boreas and Vanguard	
On or Off-shore	On	Off	On ¹²	Off	On	Off	On	Off
2022	0	0	0	0	0	0	148	0
2023	0	0	0	0	0	621	67	0
2024	167	0	167	0	97	621	50	400
2025	169	200	169	200	97	621	26	800
2026	86	0	86	0	0	0	28	400
2027	0	0	0	0	0	0	1	0

3.3.3 It should be noted that the labour markets and study areas for these projects are not consistent, and in some instances the definition of employment over the construction phase is not clear, so some judgements have been made based on the information presented. Construction phases have been determined by the East Anglian Hub's project website, as per **paragraph 3.3.2** above, and interpreted from the Environmental Statements for each scheme in that context.

3.3.4 The following supplementary table sets out the source of information relating to the number, timescale, industrial sectors and spatial considerations of these projects, and caveats relating to the numbers.

Table 3.3: Supporting Information for Table 3.1

Project	Details
EA One (N) ¹³ and EA TWO	<p>Offshore = Table 30.57 shows a mid-point used for assessment (see para 199) of FTE jobs for construction of offshore infrastructure</p> <p>Onshore = Jobs based on Table 30.50 showing direct FTEs in each of the three years of on-shore construction</p> <p>Timescale = Timescale for on-shore jobs taken from Table 30.50. Offshore taken from Table 30.57, which suggests regional employment for one year (the third year of construction). As per the Project's website,</p>

¹² As per subsequent - the onshore elements of East Anglia ONE (N) and East Anglia TWO are likely to be shared

¹³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-001535-6.1.30%20EA1N%20Environmental%20Statement%20Chapter%2030%20Tourism,%20Recreation%20and%20Socio-Economics.pdf>

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Project	Details
	<p>EA1 (N) and EA2 are both anticipated to start offshore construction in 2023, onshore construction in 2024, and be fully operational by 2026.</p> <p>Sectors = Onshore assumed to be Civils (see below); Regional offshore roles would be in installation and commissioning based on Table 30.50 – based on references made in the ES (paragraph 203 under 30.6.1.2.3)</p> <p>Regional Labour Market = Norfolk and Suffolk (NALEP)</p>
EA Three ¹⁴	<p>Offshore = Jobs based on <i>Table 28.11 Net Additional Economic Impact</i> which states for a 2-phase development there would be 621 FTE jobs supported in the Medium Impact Case in the East of England over the 3-year offshore construction phase (2023 to 2025).</p> <p>Onshore = Jobs based on Table 28.15 – 97 FTE jobs over a three year onshore construction period (2024 to 2026).</p> <p>Timescale = Timelines for construction of EA3 used in the Sizewell C Project's assessment of cumulative effects were based on information available at the time the assessment was undertaken (Q3-4 2019). At that stage, the EA3 Project was anticipated to commence construction in 2020 and last for 3.5 years. It is now apparent from the East Anglian Hub project website that the offshore construction of EA3 is anticipated to begin in 2023 (as are the construction of EA1(N) and EA2) - with onshore construction commencing in 2024, and full operation achieved by 2026.</p> <p>Sectors = Onshore assumed to be Civils (see below)</p> <p>Regional Labour Market = East of England</p>
Norfolk Boreas ¹⁵	<p>Offshore = Table 31.32</p> <p>Onshore = Table 31.30 identifies FTE jobs per year by role and % 'local' = average of 61 FTE p/a</p> <p>Sectors = Table 31.30</p> <p>Labour Market = Norfolk and Suffolk (NALEP)</p>
Norfolk Vanguard ¹⁶	<p>Offshore = Table 31.25</p> <p>Onshore = Table 31.23 identifies FTE jobs per year by role and % 'local' = average of 61 FTE p/a</p> <p>Sectors = Para 133</p> <p>Labour Market = Norfolk and Suffolk (NALEP)</p>

3.3.5 In addition to the above, the following caveats to the data are noted by information also in the public domain:

¹⁴ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010056/EN010056-000413-6.1.28%20Volume%201%20Chapter%2028%20Socio%20Economics%20Tourism%20and%20Recreation.pdf>

¹⁵ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-000417-6.1.31%20Environmental%20Statement%20Chapter%2031%20Socio-economics.pdf>

¹⁶ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-001519-Chapter%2031%20Socio-economics%20Norfolk%20Vanguard%20Es.pdf>

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- The cumulative assessment undertaken by Royal Haskoning for Norfolk Boreas¹⁷ sets out at paragraph 31.8.1.1 and Table 31.44 that as a result of a shared cable route for the projects, onshore demand for employment related to the cable route, trenchless crossings and other activities would be reduced (this has been factored into **Table 3.1** above).
- That assessment also notes that (sub-paragraph 257) "*It is understood that East Anglia ONE North and East Anglia TWO will share onshore infrastructure. FTE has been estimated at 389 for the onshore construction phase*" – as such it is likely that the onshore columns in **Table 3.1** are duplicate and one can be removed from the cumulative demand.

3.4 Construction skills for cumulative projects and Sizewell C

3.4.1 The assessment of cumulative effects was based on a list of schemes agreed with the Councils using a screening process in-line with EIA Regulations to select projects where effects may be interactive or cumulative, and using information available in the public domain on the skill requirements of each NSIP.

3.4.2 That skill information was limited for offshore wind projects' EIA, although we understand that the regional demand from those projects is most likely for specialist MEH-type and marine skills for offshore construction, and civils skill sets for onshore works.

a) Sizewell C

3.4.3 In the early (first and second) years of construction, much of the activity at Sizewell C will be enabling work – predominantly requiring (in terms of construction sectors) plant operators, earthworks operatives and project management roles.

3.4.4 The demand for construction skills for Sizewell C then falls into two categories: Main Civils and MEH (Mechanical, Electrical and Heating) operatives. A summary of the sectors within each category is set out at Table 1.1 of **Volume 2, Appendix 9A** (Technical Note 1 - Workforce Profile) [APP-196]. This is summarised in the following table:

¹⁷ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-000417-6.1.31%20Environmental%20Statement%20Chapter%2031%20Socio-economics.pdf>

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Table 3.4: Skills Required for Civils and MEH Phase – Sizewell C (Workforce Profile Technical Note)

Civils	MEH
<p>Timber and formwork, concrete/cement/steel fixers, drivers, lifting operatives and supervisors, labourers, steelwork erectors, access and other plant operators, welders, civil works labourers and semi-skilled occupations:</p> <ul style="list-style-type: none"> timber/formwork; concrete/cement/masons; drivers/crane operators/labourers; reinforced steelwork/erectors; scaffolders; welders; civil works labourers/semi-skilled 	<p>Semi-skilled mechanical, electrical and heating operatives, welders, pipefitters, cabling operatives, fitters, electricians, ladders, support services, instrumentation:</p> <ul style="list-style-type: none"> mechanical, electrical and heating labourers/semi-skilled; welders – special metals; welders – steel; boiler makers; pipe fitters; fitters; approved electricians; electro-mechanical fitters; instrumentation; and cable puller

3.4.5 Further detail on the skills needed at each stage of civils construction are set out at **Table 1.4** of the same document [\[APP-196\]](#).

3.4.6 In addition, Plate 1.1 from the **Economic Statement, Appendix A** (Employment, Skills and Education Strategy) [\[APP-691\]](#) sets out the key roles for each phase considered to be 'high demand' roles, listed in order of scale of demand in the following table:

Table 3.5: High Demand Roles for Civils and MEH Phase – Sizewell C (Employment, Skills and Education Strategy)

Civils	MEH
<ul style="list-style-type: none"> Steel fixers Joiners / Form-workers Slinger Signallers Lifting Supervisors and Appointed Persons Tower Crane operatives Project Managers Project / Site Engineers Lab Technicians CAD / BIM 	<ul style="list-style-type: none"> Approved electricians Welder craftsmen Cable installation Level 2 Operative Coatings Pipe fitters Mechanical fitters Thermal installation HVAC operatives

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	<ul style="list-style-type: none"> • Scaffolders
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b) Offshore Wind

3.4.7 Comparatively little is known about the skills required by offshore wind projects, however, in each Environmental Statement for those projects, FTE employment is split between offshore and onshore construction roles.

3.4.8 The Environmental Statement for East Anglia ONE (N) and East Anglia TWO identifies at paragraphs 203 and 204 (Ref 30.6.1.2.3):

- *BVG Associates undertook an assessment of Job Roles in Offshore Wind for Green Port Hull in 2017*
- *To gain employment in the offshore wind sector or supporting sectors require specialist skills and higher qualifications*

3.4.9 The report by BVG Associates¹⁸ suggests that the following skills/roles would be required for Installation and Commissioning of the offshore elements of the offshore wind projects (the Environmental Statement for those projects suggest that Installation and Commissioning are the jobs that would be sought from regional labour markets):

- **Turbine and Foundation Installation** – including mobilisation such as crane driver and operational management roles; crewing services such as recruitment, logistic and administration roles; and vessel maintenance roles specific to marine sectors.
- **Cable Installation** - including project management, electrical technician and cable jointing, fibre-optic technician, project and design engineers and Remote Operated Vehicle services specific to the marine environment.
- **Installation Support** – including marine-specific skillsets such as surveyors of unexploded ordnance, crew for guard vessels and oil-spill clean-up roles.

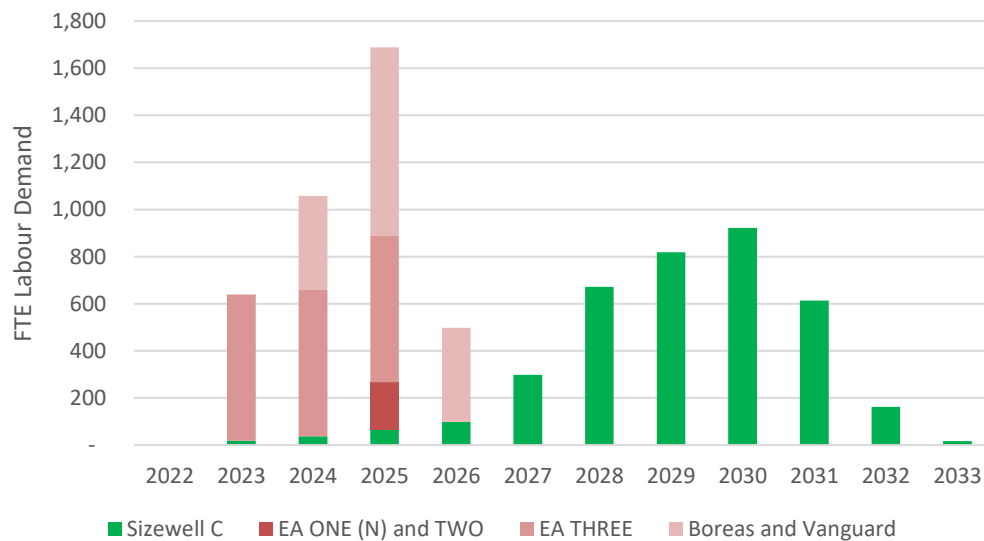
3.4.10 This suggests that while there is potential for limited overlap in demand for MEH and Professional / Management type skills between Sizewell C and offshore wind projects, this is limited due to the specific marine nature of offshore construction skillsets.

¹⁸ https://greenporthull.co.uk/uploads/files/Job_Roles_in_Offshore_Wind.pdf

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3.4.11 Where there may be an overlap – for example in project management, approved electricians and non-specialist engineering skills, the demand from offshore wind projects occurs before the MEH phase and well in advance of the peak of the Sizewell C workforce profile [APP-196].

Plate 3.1: Comparison of MEH / Professional and Management Regional (HB) labour demand from Sizewell C and Offshore Construction for Offshore Wind Projects



3.4.12 In terms of onshore construction, there is limited information on the types of skillsets required – though the Environmental Statements for Norfolk Vanguard (Table 31.23) and Norfolk Boreas¹⁹ (Table 31.30) identify the following elements of construction, which suggest that civils construction roles make up the majority of FTEs:

- Cable route (63% of FTE jobs), trenchless crossings, landfall HDD, cable pulling, highways, substations.

3.4.13 Additionally, at part 3.2.3 (para 52) of Scottish Power's *Socio-economic and Tourism Clarification Note*²⁰ produced for Deadline 1 of the examination for that project, Scottish Power note that (when considering East Anglia THREE):

¹⁹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-000417-6.1.31%20Environmental%20Statement%20Chapter%2031%20Socio-economics.pdf>

²⁰ https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-002576-ExAAS17D1V1EA1NEA2SocioEconomicsandTourismClarificationNoteSZCCIA_378234_1.pdf

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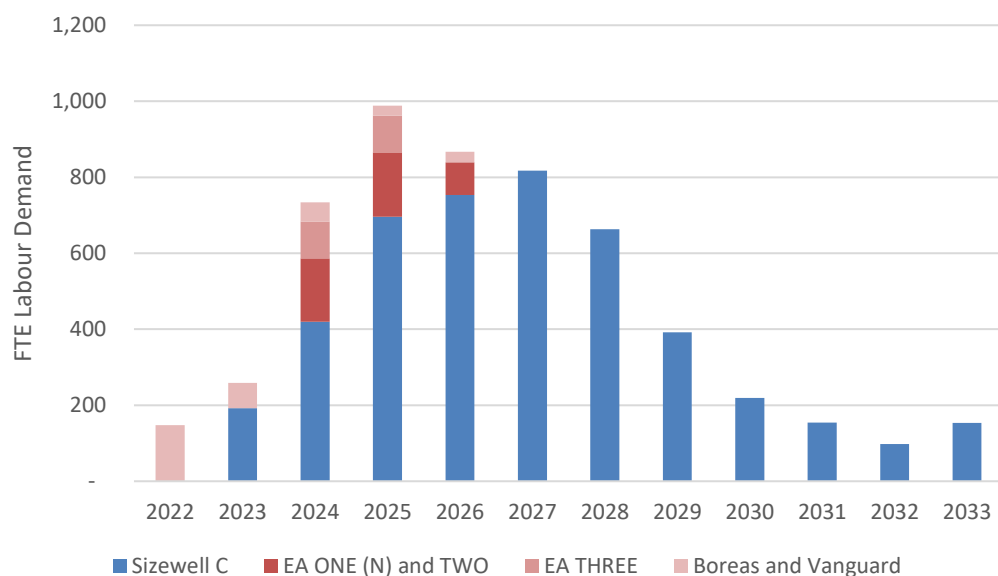
“Section 28.8.3 of Chapter 28 Socio-economics, Tourism and Recreation (EA3 APP-136) presents the relevant information on worker numbers... This is not broken down, but as per the Projects [East Anglia ONE (N) and East Anglia TWO], the assumption is that the majority of these workers would be civils”.

3.4.14 This suggests that the majority of onshore construction requires civils construction skillsets – this has the potential to overlap with the demand from Sizewell C through the civils peak of the Sizewell C Project, through to a very small extent in the context of the Projects and the regional labour market / skill supply.

3.4.15 The following chart considers the potential cumulative demand for civils construction roles between offshore wind (onshore element) and Sizewell C. This shows that:

- Peak cumulative demand for 988 civils jobs in 2025
- Sizewell C's civils peak occurs in 2027 (c. 820 roles)

Plate 3.2: Comparison of Civils Regional (HB) labour demand from Sizewell C and Offshore Construction for Offshore Wind Projects



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3.5 Summary

3.5.1 This section has set out that in terms of skills, there is likely to be little if any overlap between the offshore construction element of planned offshore wind projects, given the demand for specialist marine skills for offshore construction.

3.5.2 In terms of onshore (civils) construction, the cumulative peak between Sizewell C and offshore wind projects is estimated at 988 civil construction jobs in 2025, ahead of Sizewell C's peak local demand for 820 roles.

3.5.3 This cumulative demand for civils construction skills in the regional labour market is not considered to be significant:

- In basic terms, the difference between the cumulative regional civils peak and Sizewell C's HB civils peak demand is around 17% or 170 roles.
- This difference represents around 0.2% of residents in Norfolk or Suffolk employed in the construction industry (Annual Population Survey, Oct 2019-Sept 2020).
- In terms of the TSLS estimates of relevant construction SOC groups, this represents around 0.1% of Norfolk and Suffolk residents employed in those occupations.
- The majority of demand for civils roles from offshore wind is front-loaded, occurring when Sizewell C will be mainly in enabling works phase, which has a different demand for skills compared to mainly cable-related works at onshore elements of offshore wind projects.
- SPR consider it likely that, through the course of the projects EA One, EA Three and Norfolk Vanguard, the offshore construction labour market would have developed sufficiently to supply appropriately skilled people to the latest schemes (EA One North and EA Two) as well as SZC and Norfolk Boreas (ESs, October 2019). In their DCO submission, SPR reach the same conclusion as SZC Co (that there would not be significant cumulative effects on demand for skills in construction sectors).
- As set out above, the demand for specific civils construction skills from onshore elements of offshore wind and Sizewell C is anticipated to be different – with onshore wind requiring more tunnelling and cable

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pulling, and Sizewell C requiring more formwork, steel-fixing, welding and concrete skills.

- Each project will have its own commitment to deliver skills, agreed through either Section 106, DCO or Section 111 agreements. SC Co understands that, for example, the East Anglian Hub has a Memorandum of Understanding with Suffolk County Council and has a Skills Strategy²¹ that will seek to mitigate any potential adverse effects of each project.
- SPR (via East Anglia ONE(N) and TWO)²² notes that... *it should be noted that these are not the only two offshore wind projects being constructed in Suffolk and Norfolk. East Anglia ONE, East Anglia THREE and Norfolk Vanguard would all precede these projects. Therefore, it is likely that the supply chain would have developed by the point of construction with a labour market that could supply appropriately skilled people.*
- Sizewell C's own commitment to developing skills is substantial, and will include a specific Workforce Delivery Strategy for the Civils Construction Phase. That Strategy will set out the skill requirements for the phase, and be used by SCC's Regional Skills Coordination Function to deliver Annual Workforce Delivery Implementation Plans to focus on directing funds (see **Section 4**) to appropriate skills development activities for the Project and the Region.

4 Approach to Mitigation / Enhancement

4.1.3 SZC Co. notes that in ESC's Relevant Representation [RR-0342] it is stated that:

"All the identified projects include proposals for skills strategies in the locality" and that "this Council needs to ensure that we are satisfied that SZC Co.'s proposals for boosting skills and employment in the region are deliverable to minimise the cumulative effects arising from the in-combination construction of the various consented or under consideration NSIPs in the region" (paragraph 2.267).

²¹ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010056/EN010056-001035-EAONE%20Skills%20Strategy.pdf>

²² Paragraph 315 - <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-001535-6.1.30%20EA1N%20Environmental%20Statement%20Chapter%2030%20Tourism,%20Recreation%20and%20Socio-Economics.pdf>

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4.1.4 SZC Co. sets out at paragraph 4.3.41 of **Volume 10, Chapter 4** of the **ES** [APP-578]:

“SZC Co.’s proposed mitigation / enhancement of benefits in terms of supply chain, employment, skills and education are inherently cumulative, as they work within the framework of development, plans and growth sector strategies (e.g. construction and energy) set by regional bodies such as Suffolk County Council and NALEP for the region”.

4.1.5 As set out in the **Economic Statement, Appendix A** (Employment, Skills and Education Strategy) [APP-691], SZC Co. recognises the importance of taking a holistic approach to labour market resilience and support for the region’s growth strategies and key sectors including construction and energy, in order to avoid risks of exceeding capacity in key skills within the labour market for the delivery of all of the NSIPs in the East of England.

4.1.6 SZC Co. recognises that the region is preparing for a large number of projects both in planning and further down the pipeline; has had regard to that demand when considering enhancement and mitigation proposals related to the labour market and supply chain; and is keen to work within SCC's principle of promoting legacy skills that benefit both the Sizewell C Project and the region in the future.

4.1.7 SZC Co. is working with SCC, ESC, NALEP and Suffolk Chamber of Commerce to develop a forward-looking plan for skills and employment which would include WDS for each phase of construction, with enough lead-in time to be effective in bringing labour to the market, and would provide an Asset Skills Enhancement and Capability (ASEC) Fund, an Outreach Fund and other measures scoped with the region's need and aspiration for legacy skills in mind.

4.1.8 Detail of SZC Co.’s proposed approach to mitigation and enhancement of skills, employment, education and supply chain is set out in the **Draft Deed of Obligation** (Doc Ref. 8.17(C)), but with specific reference to issues presented here, the following are key points to highlight:

1. SZC Co. and contractors will produce Workforce Delivery Strategies for each phase, setting out Skills Prospectus information that the Councils can use to overlay regional estimates for ‘legacy skills’.
2. The proposed governance structure for the Economic Review Group (see **Draft Deed of Obligation, Schedule 7** (Doc Ref. 8.17(C))) means that the Councils can use this information to focus funding provided by

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SZC Co. on an annual basis on areas where there is likely to be overlap in demand, and where there is likely to be a regional skills legacy.

- a. SZC Co. proposes to contribute to the funding of a Regional Skills Coordination function for this purpose – to ensure that the mitigation/enhancement proposed is directed towards the skills and training in sectors where there is most likely to be an overlap in demand.
3. In using the ASEC Fund, SZC Co. notes that the funding is used to leverage match-funding for the region, and can be applied to existing capital facilities and resources for the wider infrastructure sector in the region.

APPENDIX 24A WEEKLY HGV PEAK DELIVERIES

SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - TT.1.16

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YEAR #																														
QUARTER	Q1															Q2														
MDS HGV Count	81	151	162	166	173	140	138	135	190	269	293	231	226	210	212	199	193	221	284	321	344	312	329	303	200					

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

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YEAR #	Year 1																													
QUARTER	Q3															Q4														
MDS HGV Count	176	200	211	208	242	272	418	218	239	239	258	256	251	265	243	246	299	300	299	246	244	248	229	290	331	38				

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #	Year 2																													
QUARTER	Q1															Q2														
MDS HGV Count	76	339.7	344.7	290	286	246	274	230	282	201	160	155	147	113	189	160	195	179	221	226	188	185	234	173	182	162	195			

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

MDS HGV Count																													
YEAR #																													
QUARTER	Q3															Q4													
MDS HGV Count	180	201	155	156	148	188	160	150	148	173	157	181	160	175	144	157	168	179	183	193	183	196	191	243	87	57	234	256	252

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SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

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YEAR #	Year 3																												
QUARTER	Q1								Q2																				
MDS HGV Count	239	293	264	245	232	219	219	228	217	209	189	191	186	189	216	222	223	216	241	231	225	225	223	256	256	256	250	251	251

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SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

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YEAR #	Year 4																											
QUARTER									Q2								Q3											
MDS HGV Count	243	243	242	244	327	328	330	332	268	263	262	262	187	185	185	185	185	254	254	259	259	261	255	255	255	283	283	283

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SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #																												
QUARTER	Q3								Q4								Q1											
MDS HGV Count	252	243	224	224	224	224	224	254	254	255	254	266	266	265	265	300	298	296	290	292	308	306	306	304	264	264	263	244

NOT PROTECTIVELY MARKED

SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #																												
QUARTER									Q4								Q1											
MDS HGV Count	283	260	260	260	260	242	242	242	242	242	261	261	261	255	245	245	245	245	251	251	251	251	249	249	250	260	250	249

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SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #	Year 5																											
QUARTER	Q2														Q3													
MDS HGV Count	249	249	240	240	240	240	254	254	254	233	323	323	323	333	238	238	238	238	228	228	228	228	275	275	275	275	242	242

NOT PROTECTIVELY MARKED

SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #																												
QUARTER	Q4														Q1												Q2	
MDS HGV Count	242	242	242	281	281	281	281	231	231	231	231	275	275	275	275	253	253	253	253	264	264	264	264	264	242	242	242	242

NOT PROTECTIVELY MARKED

SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #	Year 6																											
QUARTER															Q3												Q4	
MDS HGV Count	231	231	231	231	232	216	216	216	216	216	228	228	228	228	231	231	231	231	222	222	222	222	224	224	224	224	238	238

NOT PROTECTIVELY MARKED

SIZEWELL C PROJECT -
RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

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YEAR #		Year																										
QUARTER		Q1														Q2												
MDS HGV Count	238	238	224	224	224	224	224	227	227	227	227	230	230	230	230	224	224	224	224	224	227	227	227	227	224	224	224	209

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #																									
QUARTER	Q4												Q1												
MDS HGV Count	220	222	222	222	222	213	213	213	213	209	209	209	209	209	211	211	211	211	213	213	213	230	230	230	230

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #	Year 10																									
QUARTER	Q2												Q3													
MDS HGV Count	230	221	221	221	221	218	218	218	218	218	213	213	213	213	211	211	211	211	205	205	205	205	205	203	203	203

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #																										
QUARTER	Q4									Q1																
MDS HGV Count	203	198	198	198	198	195	195	195	195	195	190	190	190	190	184	184	184	184	184	181	181	181	181	173	173	173

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SIZEWELL C PROJECT -

RESPONSES TO EXAMINING AUTHORITY'S WRITTEN QUESTIONS ISSUED ON 21ST APRIL 2021

MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #	Year 11																											
QUARTER	Q2														Q3													
MDS HGV Count	173	167	167	167	167	152	152	152	152	152	128	128	128	128	108	108	108	##	94	94	94	94	94	94	94	94	93	

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MDS HGV Deliveries Profile - 1

NOT PROTECTIVELY MARKED

YEAR #											Year 12											
QUARTER	Q4										Q1											
MDS HGV Count	93	93	93	93	75	75	75	58	58	58	56	56	56	56	56	56	56	56	56	56	56	41

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MDS HGV Deliveries Profile - 1

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YEAR #												
QUARTER	Q2										Q3	
MDS HGV Count	41	41	41	41	41	41	41	41	41	41	40.77	

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APPENDIX 24B COMPARISON OF SCOTTISH POWER RENEWABLES DEVELOPMENT TRAFFIC ASSUMPTIONS

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1 INTRODUCTION

- 1.1.1 An application for a Development Consent Order (DCO) for a new nuclear power station, Sizewell C in Suffolk, was submitted to PINS in May 2020.
- 1.1.2 The transport modelling undertaken to inform this DCO included 'cumulative' assessment scenarios that incorporated the traffic impacts of Scottish Power Renewables proposed 'East Anglia' developments that could potentially be constructed at the same time as Sizewell C.
- 1.1.3 As described in the Sizewell C Transport Assessment (TA, [\[AS-017\]](#)) and Consolidated TA (Doc Ref. 8.5(B)), the forecast construction years that have been assessed are:
- 2023 early years; and
 - 2028 peak construction.
- 1.1.4 The traffic inputs associated with Scottish Power Renewables proposed development, that were used to inform the Sizewell C modelling, are provided in Appendix 8C of the Consolidated TA (Doc Ref. 8.5(B)). These were derived from the Preliminary Environmental Impact Assessment (PEIR) produced by Scottish Power Renewables for the proposed 'East Anglia One North' (EA1N) and 'East Anglia Two' (EA2) developments. At the time of developing the forecast models for the Sizewell C DCO, this was the latest information available; following discussions with Scottish Power Renewables and their consultants Royal HaskoningDHV, it was agreed to assess the potential for concurrent construction of EA1N and EA2 in both the Sizewell C early years (2023) and peak construction (2028) scenarios.
- 1.1.5 Scottish Power Renewables has since submitted a DCO application for the East Anglia projects including an Environmental Statement (ES) that contains updated traffic inputs superseding those contained in the PEIR.
- 1.1.6 These traffic inputs were not updated in the Sizewell C modelling due to the advanced stage of the DCO application.
- 1.1.7 This note provides a comparison of the EA1N and EA2 development traffic inputs set out in the PEIR (used in Sizewell C modelling) and the ES (latest figures).

2 EAST ANGLIA PROJECTS – COMPARISON OF PEIR AND ES

2.1.1 At the time of modelling Sizewell C, the PEIR for the East Anglia projects indicated that only the construction of EA1N and EA2 could potentially overlap with the construction of Sizewell C and that for robustness concurrent construction (of both EA1N and EA2) would be assumed in both 2023 early years and 2028 peak construction assessments. EA3 would not overlap with the Sizewell C assessment periods so this was excluded.

2.1.2 At a meeting between SZC Co., WSP and Royal HaskoningDHV held on 16th April 2021, the differences in traffic inputs between the PEIR and the ES were reviewed and it was agreed that the differences were not significant.

2.1.3 A summary of the PEIR/ES comparison of 24-hour flows is presented below in Table 1.

Table 2.1: EA1N and EA2 Trip Generation

Area	Workers		Worker vehicles (24-hour two way flows)		HGVs (24 hours two way flows)	
	PEIR	ES	PEIR	ES	PEIR	ES
Landfall	32	35	42	46	45	48
Section 1	70	53	94	70	54	56
Section 2	53	53	70	70	53	49
Section 3	44	44	58	58	48	44
Section 3A	9	9	12	12	10	9
Section 4	47	61	62	82	83	69
Substation	92	134	122	178	82	98
NG substation	19	19	38	38	45	45
Total	357	399	486	542	410	409
Capped on A12					322	270

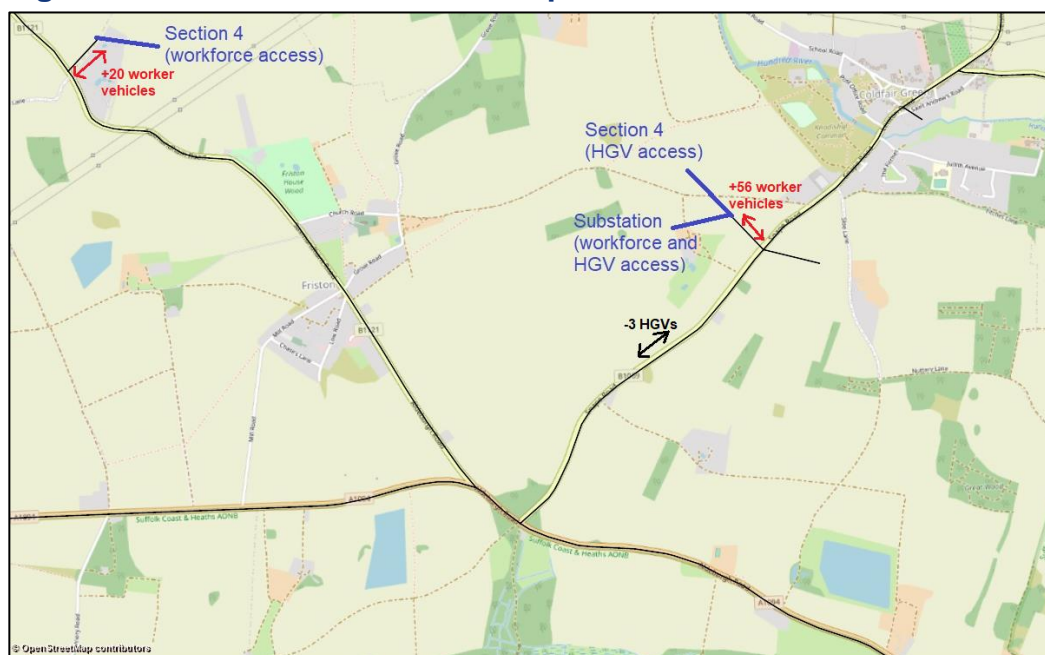
2.1.4 Worker vehicle trips are broadly the same or lower at the majority of site accesses in the ES compared with those in the PEIR which were used for Sizewell C modelling, with the exception of Section 4 and the Substation. Ten additional vehicle trips are predicted, each way (20 trips), at Section 4 which is accessed from the B1121. A further 28 additional vehicle trips are predicted, each way (56 trips), at the Substation which is accessed from the

B1069. In any particular hour this equates to a total of around one additional trip every two minutes (as the outbound trip would not be made in the same hour as the inbound trip).

2.1.5 HGV numbers are virtually unchanged except for a slight increase at the Substation, however this is offset by a reduction at Section 4 which is accessed via the same route (on the B1069, although workers' access to Section 4 is via the B1121). Thus the combined trips are virtually unchanged from the PEIR assumptions.

2.1.6 Figure 1 demonstrates the combined flow differences on the B1069 and B1121. Worker vehicles would be able to access the site from any route, so for example not all of the 56 additional vehicles accessing the Substation would travel through the A1094/B1069 junction, as some would travel from the Leiston area.

Figure 1: B1069 and B1121 access points



2.1.7 It should be noted that the spreadsheet assessment undertaken by Royal HaskoningDHV for Scottish Power Renewables considers both 100% of the 410 HGVs travelling from the A12 north and 100% from the A12 south. However a cap on HGVs on the A12 was defined in the PEIR at 322 vehicles so this volume was used for input to the Sizewell C modelling, which applied a distributional split of HGVs (85% south / 15% north) as agreed with Scottish Power Renewables and SZC Co. Whilst the cap of

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322 should have applied to only the A12 HGVs, rather than the total, the cap is now reduced in the ES to 270 vehicles, which is very similar to the 274 movements (85% x 322) that was assessed in the Sizewell C modelling.

3 CONCLUSION

- 3.1.1 Based on this comparison of EA1N and EA2 traffic generation, between the PEIR that was used as the basis for the Sizewell C assessment, and the latest assumptions identified in the ES, it has been agreed with Royal HaskoningDHV and SZC Co. that the differences in EA1N and EA2 traffic flows between the PEIR and ES are negligible. It is considered that the cumulative assessment undertaken for the Sizewell C Project is therefore still valid.

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APPENDIX 24C MITIGATION FOR B1122 COMMUNITIES DURING THE EARLY YEARS

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1 INTRODUCTION

- 1.1.1 This note concerns the impacts on the B1122 communities (Yoxford, Middleton Moor and Theberton) in the early years (i.e. before the Sizewell link road (the SLR) is constructed). It explains how the current DCO application proposes to mitigate impacts on the B1122 communities during the early years and what additional actions can be considered to further mitigate the early years impacts. Overall, of course, the SLR is intended to bring medium and long term benefit to the B1122 communities.

2 EARLY YEARS IMPACTS ON THE B1122 COMMUNITIES

- 2.1.1 The early years assessments relate to the effects in 2023, when there would be up to 300 HGV deliveries per day (600 two-way movements)¹.
- 2.1.2 The **Environmental Statement (ES)** (Doc Ref. Book 6) and the **Consolidated Transport Assessment** (Doc Ref. 8.5(B)) set out the effects of the SZC construction traffic on the B1122 and on local communities during the early years prior to the opening of the SLR.
- 2.1.3 The early years construction of Sizewell C would bring a significant increase in traffic on the B1122. **Table 2.1** shows that from the 2023 reference case to early years (i.e. with Sizewell C traffic) a 278% increase in HGVs/Buses and a 27% increase in total vehicles is predicted at Theberton (Location 10) before the Sizewell link road is in place.

¹ As stated in the Transport Assessment [APP-602], the Transport Assessment Rev 2.0 [AS-017] and the Transport Assessment Addendum Rev 1.0 [AS-266]. The number of movements in the Early Years did not change as a result of the changes submitted in January 2021.

Table 2.1: Comparison of 24-hr AAWT traffic flows between 2023 reference case and 2023 early years (WSP, 2021)

Location	24 hour AAWT Flows with <u>no 2VBP or SLR in place</u>			
	2023 Reference Case (future year without Sizewell C)		2023 Early Years Construction including existing flows	
	HGVs/ Buses	Total Vehs	HGVs/ Buses	Total Vehs
10 (B1122 through Theberton)	216	6,037	816	7,671
10A (Theberton Bypass)	0	0	0	0
13b (B1122, east of A12)	177	4,150	801	5,261
13c (A12, between A1120 and B1122)	850	15,675	1,465	17,042
13e (A12, south of A1120)	721	12,137	1,337	13,238
22a (A12, north of A1094)	637	15,748	1,390	17,152
22b (A1094, east of A12)	183	8,539	303	9,223
41 (B1125 through Middleton)	42	2,127	42	2,656
57 (Sizewell link road– east of A12)	0	0	0	0
59 (A12 –, north of B1121)	713	12,079	1,470	13,373
63 (Theberton bypass, west of B1125)	0	0	0	0
64 (B1122, north of SZC access)	216	6,037	816	7,671
65 (Middleton Moor Link)	0	0	0	0
66 (B1122, west of B1125)	165	3,496	765	4,589
74 (B1122, Middleton Moor)	177	4,150	777	5,237

2.1.4 There are 146 properties immediately adjacent to the B1122 or the section of the A12 that passes through Yoxford. Between Yoxford and Theberton there are 21 statutory listed buildings.

2.1.5 During the early years SZC Co. predict short-term major adverse effects on pedestrian amenity on the B1122 from construction traffic (Book 6, Volume 2, Chapter 10, para 10.7.5). The increase in traffic on the B1122 during the early years of construction would adversely affect walkers where Footpaths E-396/017/0, E396/023/0, E-396/015/0, E-515/004/0, E515/007/0, E-515/012/0, E-515/013/0, E-515/016/0 cross or end near the B1122 and where E-584/020/0 ends at the B1122 junction with the A12 and where Footpath E-584/021/0 ends at the A12 (Book 6, Vol 6, Chapter 8, paragraphs 8.6.32, 8.6.39, 8.6.47, 8.6.53, 8.6.65).

- 2.1.6 SZC Co. also predict major adverse effects on cycle amenity on the B1122 during early years from construction traffic (Book 6, Volume 2, Chapter 10, para 10.7.5).
- 2.1.7 SZC Co. predict that there will be moderate adverse noise effects along sections of the B1122 as a result of Sizewell C Project construction traffic in the early years before the Sizewell link road is in place to mitigate this impact (Book 6, Volume 2, Chapter 11, para 11.6.92).

3 CURRENT DCO PROPOSALS TO MITIGATE IMPACTS ON THE B1122 COMMUNITIES DURING THE EARLY YEARS

- 3.1.1 The above effects are only acceptable if there is no practical alternative. It would be unacceptable for these effects to be imposed on the communities along the B1122 for the whole 10-12 year construction programme.
- 3.1.2 In the currently submitted DCO application the following measures are committed to in the early years, which will assist in limiting and mitigating impacts on the B1122 communities:

Early years freight transport strategy measures

- There are limits proposed on the number of HGV movements in the early years until the Sizewell link road and two village bypass are available for use (no more than 600 movements per day (300 deliveries) Monday to Friday and no more than 500 HGV movements per day (250 deliveries) on Saturdays). This is set out in the revised Construction Traffic Management Plan (Doc. Ref. 8.7(A)).
- A delivery management system will be used to regulate the flow of HGVs and ensure that HGVs adhere to the designated HGV routes.
- During the early years on Monday- Friday, Sizewell C HGVs will be limited to arrive at the main development site between the hours of 07:15-21:00. The latest departure of Sizewell C HGVs from the main development site will be 23:00. On Saturdays Sizewell C HGVs will be limited to arrive at the main development site between the hours of 08:00-13:00. The latest departure of Sizewell C HGVs from the main development site will be 14:00. On Sundays and public holidays there will be no Sizewell C HGV movements on the local highway network.

- HGVs will be limited to arrive at the main development site between the hours of 07:15-21:00 on Monday-Friday and the latest departure of Sizewell C HGVs from the main development site will be 23:00. On Saturdays HGVs will be limited to arrive at the main development site between the hours of 08:00-13:00. The latest departure of Sizewell C HGVs from the main development site will be 14:00. There will be no Sizewell C HGV movements on the local highway network on Sundays or on public holidays.
- SZC Co. proposes to construct a temporary single railway track with railway sidings and a passing loop for the locomotive within the LEEIE. This would enable two trains per day to be brought in via the Saxmundham to Leiston branch line in the early stage of the construction phase (they would be operational 1 year in).

Early Years workforce transport strategy measures

- Proposals to limit the number of trips on the B1122 by the construction workforce using the B1122 to reach the main development site as set out within chapter 4 of the Construction Worker Travel Plan (Doc. Ref. 8.8A) :
 - Caravan park and the Land East of Eastland Industrial Estate (LEEIE) for 600 workers in order to provide accommodation close to the main development site and enable workers to walk, cycle or get a LEEIE park and ride bus to/from the main development site.
 - Parking permit system for a restrained car park at the main development site and to promote car sharing.
 - Ensuring compliance with the Construction Worker Travel Plan (CWTP). The CWTP will monitor compliance with the mode share target for the construction workforce.

Other measures

- SZC Co. will carry out a pre-condition highway survey on the B1122 prior to commencement. SZC Co. will also provide funding for the maintenance of the road during the early years of construction when it is to be used by Sizewell C construction traffic. The completion of the highway survey and the provision of maintenance funding will be secured through obligations in a Deed of Obligation (see reference to the 'B1122 Pre-SLR Contribution' in schedule 16, paragraph 1 and 6 in the **draft Deed of Obligation** (Doc Ref. 8.17(C))). The maintenance of the road surface during the

early years would limit noise and mitigate to some extent the adverse cycle amenity effects on the B1122 during the early years.

- The **Noise Mitigation Scheme** (Doc. Ref. 6.3 11H (A)) will be secured through the Deed of Obligation to facilitate the installation of noise insulation for properties affected by noise from the project, including road traffic noise, subject to meeting stated criteria.
- The **draft Deed of Obligation** (Doc Ref. 8.17(C)) confirms that SZC Co. will use reasonable endeavours to carry out and complete a number of measures that will assist in limiting impacts on the B1122 communities (i.e. the completion of the Sizewell link road, the accommodation campus), park and ride car parks and the two Beach landing facilities, in accordance with the **Implementation Plan** (Doc. Ref. 8.4I(A)) .
- The current speed limit on the B1122 between the A12 at Yoxford and the proposed access road to Sizewell C varies along the road between 30 miles per hour (mph), 40mph and 60mph zones. GPS will monitor HGV adherence to speed limits on the B1122, which will be reported to the Transport Review Group. Further discussions are ongoing with SCC in relation to speed limits along the B1122.

4 FURTHER ACTIONS TO MITIGATE THE EARLY YEARS IMPACTS ON B1122 COMMUNITIES

- 4.1.1 A number of other measures are possible, which would reduce impacts on the B1122. SZC Co. proposes to discuss these further with ESC and SCC to assess whether they may be suitable for inclusion in the DCO proposals.

a) **Accelerate the early provision of off-site park and rides**

- 4.1.2 The Implementation Plan submitted with the DCO [[APP-599](#)] envisaged that the southern park and ride facility would be operational just before the Sizewell link road and that the northern park and ride facility would be operational at a similar time to the Sizewell link road.

- 4.1.3 The updated **Implementation Plan** (Doc. Ref. 8.4I(A)) proposes to accelerate the provision of the northern and southern park and ride facilities. They are both now envisaged to be operational in early Year 2 of the construction phase, circa 1 year prior to the Sizewell link road being operational. This would enable workers to be transferred from car to park and ride bus for onward travel to the main development site and reduce

the number of cars on the B1122 compared to the early years assessment in the **Consolidated Transport Assessment** (Doc Ref 8.5(B)).

- 4.1.4 Further discussions with SCC will consider whether the use of mini buses might be a sensible approach in the early years for the transport of construction workers.

b) Noise mitigation proposals

- 4.1.5 The B1122 maintenance fund under the Section 106 will be used to maintain the road surface of the B1122 in a suitable condition, so that potholes and other discontinuities are avoided, which will serve to keep groundborne vibration levels to a minimum.

c) Environmental proposals

- 4.1.6 A number of measures have previously been discussed with stakeholders and SZC Co. commits to re-opening these discussions to appropriateness as early years mitigation, specifically in terms of:

- a) monitoring traffic speeds and associated traffic calming;
- b) pedestrian enhancements along the B1122, to be secured in the Deed of Obligation; and
- c) any other measures identified by East Suffolk, Suffolk County Councils, the parish councils along the B1122 and Suffolk Constabulary.

- 4.1.7 SZC Co. is also aware that suggestions have been made for minor footway enhancements on the B1122 by Scottish Power Renewables as part of the mitigation package for the East Anglia One North off-shore wind farm [DR029 - Link 6b Mitigation \(planninginspectorate.gov.uk\)](#).

- 4.1.8 SZC Co. proposes to engage further with ESC and SCC to consider elaborating undertakings proposed in the draft S106 obligation to fund local PROW proposals and pedestrian, cycle and public realm improvements within the public highway. These would be additional to those proposed by SPR.

- 4.1.9 It has been anticipated that SZC Co.'s commitment could be used to help long term, lasting legacy benefits for the B1122 after the early years, and that the road would benefit from investment in environmental, pedestrian and cycle improvements to enhance its future as a rural road, bypassed by the SLR. There may, however, be benefit in bringing forward some of these measures to help mitigated the early years' construction traffic impacts.

APPENDIX 24D RESPONSE TO QUESTION EXA REF. TT.1.112

1 TRANSPORT – APPENDIX IN RESPONSE TO TT 1.112

1.1 Introduction

1.1.9 This technical note has been written in response to the Examination Authority's traffic and transport question TT.1.112, which seeks to understand the potential transport impacts associated with the period of highest environmental impact.

1.1.10 As set out in the response to question TT.1.112, if the effect on vulnerable road users is assessed to be not significant in the hour of greatest change in traffic flows (i.e. representative hour of 07:00-08:00), then the effect would be not significant in all other hours of the day that vulnerable road users are likely to use the network (including the hour of highest environmental impact) as the percentage change in traffic would be less in those hours.

1.1.11 The exception to this is for the links that have been assessed within **Volume 1, Chapter 2** of the **ES Addendum** [[AS-181](#)] to have a significant adverse effect based on the representative hour but the effect has been considered to be not significant as the representative hour did not coincide with the hour of highest environmental impact (e.g. at the start/end of the school day). In these small number of cases, an assessment of the hour of highest environmental impact should have been undertaken and has been included within this note.

1.1.12 **Volume 1, Chapter 2** of the **ES Addendum** [[AS-181](#)] assessed the following links to have a significant adverse effect on severance in the representative hour (07:00-08:00) during the 2023 early years phase, but the effect was considered to be not significant as it did not coincide with the hours of highest vulnerable users:

- Link 11 - B1125 through Westleton (high sensitivity due to a playground)
- Link 13d - A1120 (high sensitivity due to Yoxford and Peasenhall primary school)
- Link 90 - A1120 Sibton, east of Mill Hill (high sensitivity due to Sibton Nursery School)

1.1.13 The effect on the above links in the 2028 peak construction and 2034 operational phase scenarios was assessed to be not significant and therefore the severance effect in the hour of greatest environmental impact for these scenarios would also be not significant. The assessment of these scenarios is therefore not required.

1.1.14 Likewise, the effect on pedestrian delay, amenity and fear and intimidation on the above links in the representative hour was assessed in **Volume 1, Chapter 2** of the **ES Addendum** [[AS-181](#)] to be not significant. Therefore, the effect on pedestrian delay, amenity and fear and intimidation on these links during the hour of greatest environmental impact would also be not significant and does not need to be assessed.

1.2 Assessment of highest environmental impact

1.2.9 This note assesses the potential effect on severance for the 2023 early years phase for the following hours of greatest environment impact:

- 08:00- 09:00: associated with school drop off; and
- 15:00-16:00: associated with school pick up / use of playground during the weekday at the end of the school day.

1.2.10 Link 11 has only been assessed for the PM hour (15:00-16:00) of greatest environmental impact as its sensitivity is due to a nearby playground, that is likely to have peak weekday use after the school day.

1.2.11 **Tables 1.1** and **1.2** below summarises the assessment on severance in the 2023 Early years scenario for the hours of 08:00-09:00 and 15:00-16:00, respectively.

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Table 1.1 – 2023 Early Years Severance – Highest Environmental Impact (08:00-09:00)

Link	Link Name	2023 Ref Case (veh)	2023 Ref + Sizewell C (veh)	% change	Magnitude	Sensitivity	Impact Significance
13d	A1120 Yoxford	292	313	7.2%	Very low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	329	351	6.7%	Very low	High	Minor adverse

Table 1.1 – 2023 Early Years Severance – Highest Environmental Impact (15:00-16:00)

Link	Link Name	2023 Ref Case (veh)	2023 Ref + Sizewell C (veh)	% change	Magnitude	Sensitivity	Impact Significance
11	B1125 Westleton	244	264	8.2%	Very low	High	Minor adverse
13d	A1120 Yoxford	362	385	6.4%	Very low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	405	429	5.9%	Very low	High	Minor adverse

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1.2.12 It can be seen from the assessment in **Tables 1.1** and **1.2** that there are no significant severance effects in the 2023 Early Years for hours of greatest environmental impact.

1.3 **Summary**

1.3.9 The assessment undertaken for the hours of greatest environmental impact do not result in the introduction of new significant adverse effects.

APPENDIX A: ASSESSMENT OF HIGHEST ENVIRONMENTAL IMPACT

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Early Years

Table 1: Severance 2023 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic

Link Number	Link Name	2023 Ref HGEI total traffic	2023 ref HGEI + Sizewell total traffic	% change	Severance (<30, 30-60, 60-90, >90)	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-
13d	A1120	292	313	7.2%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	329	351	6.7%	Very Low	High	Minor adverse

Table 2: Severance 2023 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic

Link Number	Link Name	2023 Ref HGEI total traffic	2023 ref HGEI + Sizewell total traffic	% change	Severance (<30, 30-60, 60-90, >90)	Sensitivity	Effect Significance
11	B1125 through Westleton	244	264	8.2%	Very Low	High	Minor adverse
13d	A1120	362	385	6.4%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	405	429	5.9%	Very Low	High	Minor adverse

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Table 3: Pedestrian Delay 2023 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic

Link Number	Link Name	2023 Ref HGEI total traffic	Mean Pedestrian delay (secs)	2023 ref HGEI + Sizewell total traffic	Mean Pedestrian delay (secs)	Mean Pedestrian delay change(secs)	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-	-	-
13d	A1120	292	1.65	313	1.70	0.06	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	329	1.75	351	1.82	0.07	Very Low	High	Minor adverse

Table 4: Pedestrian Delay 2023 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic

Link Number	Link Name	2023 Ref HGEI total traffic	Mean Pedestrian delay (secs)	2023 ref HGEI + Sizewell total traffic	Mean Pedestrian delay (secs)	Mean Pedestrian delay change(secs)	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	244	1.53	264	1.58	0.05	Very Low	High	Minor adverse
13d	A1120	362	1.85	385	1.93	0.08	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	405	2.00	429	2.10	0.09	Very Low	High	Minor adverse

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Table 5: Amenity 2023 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic

Link Number	Link Name	2023 Ref HGEI total traffic	2023 ref HGEI + Sizewell total traffic	% change	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-
13d	A1120	292	313	7.2%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	329	351	6.7%	Very Low	High	Minor adverse

Table 6: Amenity 2023 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic

Link Number	Link Name	2023 Ref HGEI total traffic	2023 ref HGEI + Sizewell total traffic	% change	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	244	264	8.2%	Very Low	High	Minor adverse
13d	A1120	362	385	6.4%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	405	429	5.9%	Very Low	High	Minor adverse

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Peak Construction

Table 7: Severance 2028 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic Typical Day

Link Number	Link Name	2028 Ref HGEI total traffic	2028 Ref HGEI + Sizewell total traffic	% change	Severance (<30, 30-60, 60-90, >90)	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-
13d	A1120	305	322	5.6%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	343	359	4.7%	Very Low	High	Minor adverse

Table 8: Severance 2028 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic Typical Day

Link Number	Link Name	2028 Ref HGEI total traffic	2028 Ref HGEI + Sizewell total traffic	% change	Severance (<30, 30-60, 60-90, >90)	Sensitivity	Effect Significance
11	B1125 through Westleton	255	282	10.6%	Very Low	High	Minor adverse
13d	A1120	406	449	10.6%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	446	490	9.9%	Very Low	High	Minor adverse

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Table 9: Severance 2028 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic Busiest Day

Link Number	Link Name	2028 Ref HGEI total traffic	2028 Ref HGEI + Sizewell total traffic	% change	Severance (<30, 30-60, 60-90, >90)	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-
13d	A1120	305	322	5.6%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	343	359	4.7%	Very Low	High	Minor adverse

Table 10: Severance 2028 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic Busiest day

Link Number	Link Name	2028 Ref HGEI total traffic	2028 Ref HGEI + Sizewell total traffic	% change	Severance (<30, 30-60, 60-90, >90)	Sensitivity	Effect Significance
11	B1125 through Westleton	255	282	10.6%	Very Low	High	Minor adverse
13d	A1120	406	450	10.8%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	446	491	10.1%	Very Low	High	Minor adverse

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Table 11: Pedestrian Delay 2028 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic Typical Day

Link Number	Link Name	2028 ref HGEI total traffic	Mean Pedestrian delay (secs)	2028 ref HGEI + Sizewell total traffic	Mean Pedestrian delay (secs)	Mean Pedestrian delay change(secs)	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-	-	-
13d	A1120	305	1.68	322	1.73	0.05	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	343	1.79	359	1.85	0.05	Very Low	High	Minor adverse

Table 12: Pedestrian Delay 2028 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic Typical Day

Link Number	Link Name	2028 ref HGEI total traffic	Mean Pedestrian delay (secs)	2028 ref HGEI + Sizewell total traffic	Mean Pedestrian delay (secs)	Mean Pedestrian delay change(secs)	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	255	1.56	282	1.62	0.07	Very Low	High	Minor adverse
13d	A1120	406	2.01	449	2.18	0.17	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	446	2.16	490	2.35	0.19	Very Low	High	Minor adverse

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Table 13: Pedestrian Delay 2028 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic Busiest Day

Link Number	Link Name	2028 ref HGEI total traffic	Mean Pedestrian delay (secs)	2028 ref HGEI + Sizewell total traffic	Mean Pedestrian delay (secs)	Mean Pedestrian delay change(secs)	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-	-	-
13d	A1120	305	1.68	322	1.73	0.05	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	343	1.79	359	1.85	0.05	Very Low	High	Minor adverse

Table 14: Pedestrian Delay 2028 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic Busiest Day

Link Number	Link Name	2028 ref HGEI total traffic	Mean Pedestrian delay (secs)	2028 ref HGEI + Sizewell total traffic	Mean Pedestrian delay (secs)	Mean Pedestrian delay change(secs)	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	255	1.56	282	1.62	0.07	Very Low	High	Minor adverse
13d	A1120	406	2.01	450	2.18	0.17	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	446	2.16	491	2.35	0.19	Very Low	High	Minor adverse

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Table 11: Amenity 2028 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic Typical Day

Link Number	Link Name	2028 ref HGEI total traffic	2028 ref HGEI + Sizewell total traffic	% change	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-
13d	A1120	305	322	5.6%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	343	359	4.7%	Very Low	High	Minor adverse

Table 12: Amenity 2028 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic Typical Day

Link Number	Link Name	2028 ref HGEI total traffic	2028 ref HGEI + Sizewell total traffic	% change	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	255	282	10.6%	Very Low	High	Minor adverse
13d	A1120	406	449	10.6%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	446	490	9.9%	Very Low	High	Minor adverse

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Table 13: Amenity 2028 Hour of Greatest Environmental Impact (08:00 – 09:00) – Total Traffic Busiest Day

Link Number	Link Name	2028 ref HGEI total traffic	2028 ref HGEI + Sizewell total traffic	% change	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	-	-	-	-	-	-
13d	A1120	305	322	5.6%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	343	359	4.7%	Very Low	High	Minor adverse

Table 14: Amenity 2028 Hour of Greatest Environmental Impact (15:00 – 16:00) – Total Traffic Busiest Day

Link Number	Link Name	2028 ref HGEI total traffic	2028 ref HGEI + Sizewell total traffic	% change	Magnitude	Sensitivity	Effect Significance
11	B1125 through Westleton	255	282	10.6%	Very Low	High	Minor adverse
13d	A1120	406	450	10.8%	Very Low	High	Minor adverse
90	A1120 Sibton, east of Mill Hill	446	491	10.1%	Very Low	High	Minor adverse

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APPENDIX 25A BORROW PIT RISK ASSESSMENT

FIGURE 1.1 SITE LOCATION MAP AND LOCAL HYDROLOGY

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