HIGHWAYS AGENCY

Safe roads, reliable journeys, informed travellers

A14 Cambridge to Huntingdon improvement scheme

Environmental Statement

Appendices

Appendix 14.1: Scheme operational noise and vibration policy

Date: December 2014

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1 Introduction

1.1 Purpose of the policy statement

1.1.1 This policy statement (the policy) sets out the approach that the Highways Agency will adopt to mitigate noise and vibration from the operation of the A14 Cambridge to Huntingdon improvement scheme (the scheme). The policy sets out the commitments relevant to noise and vibration outlined in the environmental statement, of which this policy also forms an appendix. The approach proposed to mitigate the effects of noise and vibration during construction of the scheme is set out in the *Code of construction practice* (*CoCP*) *(Appendix 20.2*).

1.1.2 This policy uses technical language which is required to describe noise and vibration. A full explanation of what constitutes traffic noise and vibration and a glossary of terms is included in *Chapter 14 of the ES*.

1.1.3 The policy responds to the three principle Government noise policy aims, set out in the *Noise Policy Statement for England (NPSE)* (Department for Environment, Food and Rural Affairs (Defra), 2010), which are to be met within the context of government policy on sustainable development:

- to avoid significant adverse impacts on health and quality of life;
- to mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

1.2 Statutory obligations and mitigation of noise effects

1.2.1 Likely noise effects are of concern to the communities adjacent to the scheme. The principle of Best Practicable Means[1] will be used in the design and construction of the scheme to finalise mitigation measures, to avoid significant adverse noise effects and to minimise adverse effects as far as practicable when the scheme is operational. The approach to the mitigation of noise impacts is described in *section 2 of this appendix*.

1.2.2 The methodology used to assess noise impacts, including the process used to determine significant adverse effects, is set out in *Chapter 14 of the ES* and in *section 3 of this appendix*.

1.2.3 In addition to using Best Practicable Means to minimise noise through integration of mitigation measures into the scheme (e.g. low noise surfacing and noise barriers), the Highways Agency would also comply with the *Noise Insulation Regulations 1975 (as amended 1988) (NIR)*. The *NIR* imposes a duty on roads authorities to carry out or make a grant in respect of carrying out noise insulation work in or to eligible buildings.

[1] Best Practicable Means are defined in Section 72 of the *Control of Pollution Act 1974* and Section 79 of the *Environmental Protection Act 1990* as those measures which are *"reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications"*.

1.2.4 There are various specific conditions set out in the *NIR* covering the assessment of noise levels and provision of noise insulation. These are set out in *section 2 of this appendix*.

1.2.5 After using Best Practicable Means through the design of the scheme, including mitigation measures to be provided, there may be locations where it is not sustainable to provide measures to reduce noise levels from the expected use of the scheme to levels below those set out in the *NIR*. Where this is the case, the Highways Agency would offer to carry out, or make a grant in respect of carrying out, noise insulation work to the occupiers of eligible properties in accordance with the requirements of the *NIR* where it is reasonably practicable to do so.

1.3 Mitigation of vibration effects

1.3.1 Likely vibration effects are of concern to the communities adjacent to the scheme.

1.3.2 The design and construction of the scheme would be undertaken so that significant levels of groundborne vibration, which could cause disturbance and give rise to concerns about damage to buildings, do not occur during operation of the scheme. The approach to the mitigation of likely ground-borne vibration effects is described in *section 2 of this appendix*.

1.3.3 Airborne noise generated by traffic can lead to airborne vibration. The approach set out in this policy to mitigate significant noise effects would reduce likely effects associated with airborne vibration nuisance. The levels at which this may occur are explained further in *section 3 of this appendix*.

2 Mitigation approach

2.1 Mitigation of noise effects

2.1.1 The principle of Best Practicable Means would be used in the design and construction of the scheme, including the design and construction of mitigation measures (e.g. low noise surfacing and noise barriers), to minimise adverse noise effects from the operation of the scheme as far as sustainable. This is consistent with the second aim of Government noise policy as set out in *NPSE* (Defra, 2010).

2.1.2 Where all Best Practicable Means to minimise noise in the scheme design and construction have been exhausted, but predicted noise levels at dwellings close to the scheme are above the qualifying thresholds for noise insulation work set out in the *NIR*, then the Highways Agency will offer to provide noise insulation. This will avoid significant observed adverse effects from noise inside people's homes, in line with the first aim of Government noise policy as set out in *NPSE* (Defra, 2010).

2.1.3 Parties who may be affected by significant noise effects or who may qualify for noise insulation work would be consulted with in accordance with the *NIR* regarding the location and design of mitigation measures.

2.1.4 Noise mitigation will be designed and constructed to contribute to the improvement (i.e. reduction) of existing noise burden consistent with the third aim of Government noise policy set out in *NPSE* (Defra, 2010), for example:

- designing the modifications of the current A14 through Huntingdon to maximise the reduction in traffic and hence maximise the reduction in existing noise levels when the scheme is operational; and
- provision of mitigation at the Important Areas on the A14 and A1 identified in the *Noise Action Plan: Roads (Including Major Roads),* Defra, 2014) that fall within the scheme's study area as defined in *Chapter 14 of the ES*.

2.1.5 In applying Best Practicable Means to minimise noise and vibration, a hierarchical approach will be applied in determining whether mitigation is sustainable:

- engineering feasibility;
- compliance with engineering design standards;
- safety matters such as the safe operation of the road, safe interaction of road and pedestrian traffic, the safety of non-motorised users (including pedestrians, cyclists and equestrians) adjacent to the road, and security and crime considerations;
- for residential properties and communities, the nature of the noise effect including the number of receptors subject to the noise impact and the proportion of the community subject to the impact;

- other likely environmental effects that may occur due to the provision of measures to reduce noise impacts e.g. loss of light or adverse effects on the landscape; and
- the cost of any proposed mitigation measure compared to the level of benefit achieved in terms of the number of properties affected, the degree of noise reduction and the reduction in noise levels or vibration magnitude, such that costs are not disproportionate to the benefits achieved.

2.1.6 Standard noise assessment and prediction methodologies (for example *Calculation of Road Traffic Noise* (*CRTN*) (Department of Transport and Welsh Office, 1988)) would be used to assess likely noise effects from the scheme to inform the application of the approach set out in this policy and in compliance with the *NIR*. The assessment methodology and the definition of what is considered a significant effect are set out in *section 3 of this appendix* and in *Chapter 14 of the ES*.

2.2 Noise insulation

2.2.1 The *NIR* sets out the statutory obligation for roads authorities to carry out or make a grant in respect of carrying out noise insulation work in or to eligible properties.

2.2.2 There are various specific conditions set out in the *NIR* covering the measurement of noise levels and the offer of carrying out or making a grant in respect of carrying out noise insulation work. In summary these are:

- A property must be an eligible building as defined in regulation 6 of the *NIR*. This definition includes dwellings and other buildings used for residential purposes.
- The building must be within 300m from the nearest point on the carriageway of a road to which regulations 3(1) or 4(1) of the *NIR* applies.
- The noise level is assessed using the methodology defined in the *NIR*. The point at which the noise level is assessed is a point at the most exposed of any doors and windows in a façade from which a straight line can be drawn to a point on the carriageway of such a road without passing through another building.
- The use of a road to which the *NIR* applies causes, or is expected to cause, noise at a level not less than 68dB$L_{pA10,18h}$ one metre in front of the most exposed of any doors and windows in a façade.
- The new highway will cause an increase in the existing overall ambient noise level of at least 1dB(A) and an increase in the highway noise of at least 1dB(A).

2.2.3 The nature and extent of any noise insulation work that may be undertaken is set out in *regulation 9 and the schedules to NIR*.

2.2.4 An initial assessment was carried out to determine the number of properties that are likely to qualify for noise insulation under the terms of the *NIR*. This is described in *Chapter 14 of the ES*. The number of properties that qualify for noise insulation would be confirmed in accordance with the NIR shortly before or after the scheme comes in to use based on the final design and construction of the scheme.

2.3 Mitigation of vibration effects

2.3.1 *Design Manual for Roads and Bridges (DMRB HD213/11)* (Highways Agency *et al.,* 2011) explains that perceptible groundborne vibration associated with the operation of a road only occurs if heavy vehicles pass over irregularities in the road surface and that higher risks of groundborne vibration could occur on heavily trafficked roads with poor surfaces and sub-grade (foundation) conditions.

2.3.2 The design and construction of the scheme will be carried out in accordance with current standards so that poor road surfaces and sub-grade conditions do not exist when the scheme is open to traffic. The design and construction of the scheme would be undertaken in accordance with the *DMRB HD213/11* (Highways Agency *et al.,* 2011), relevant local authority standards and the *Manual of Contract Documents for Highway Works (MCHW)*, as appropriate. These documents set out the standards and specifications to be met for road design and construction, including, but not limited to, the road foundations, earthworks, bridges and road pavement.

2.3.3 The new trunk roads will be provided and maintained to acceptable standards in line with the maintenance requirements for the trunk road network in England.

2.3.4 The *DMRB HD213/11* (Highways Agency *et al.,* 2011) advises that:

> "*For a given level of noise exposure the percentage of people bothered very much or quite a lot by vibration*[2] *is 10 per cent lower than the corresponding figure for noise nuisance. On average traffic induced vibration is expected to affect a very small percentage of people at exposure levels below 58L_{A10} dB and therefore zero per cent should be assumed in these cases*."

Mitigation measures to reduce significant noise effects would also reduce likely nuisance associated with airborne vibration and no additional mitigation is therefore proposed in relation to likely airborne vibration effects.

[2] 'vibration' relates to airborne vibration.

3 Assessment methodology

3.1 Assessment of noise effects

3.1.1 Noise impacts and resulting significant effects that are likely to occur due to the scheme's operation were assessed. The assessment is described in *Chapter 14 of the ES*. The following established prediction and assessment methodologies were used:

- the Government's noise policy (*NPSE,* Defra, 2010);
- the noise assessment guidance provided in *DMRB HD213/11* (Highways Agency et al., 2011), which is used for the design and assessment of trunk road projects; and
- the calculation methodology defined in the *CRTN* (Department of Transport and Welsh Office, 1998). CRTN is the method recommended in *DMRB HD213/11* (Highways Agency *et al.,* 2011) for predicting traffic noise.

3.1.2 The assessment reported in *Chapter 14 of the ES* was undertaken by identifying noise sensitive locations (receptors) adjacent to the scheme. The noise prediction methodology described in *CRTN* was used to assess existing noise levels and those that are expected to occur due to the scheme. Existing noise levels away from existing major highways are based on field measurements. Details of the baseline are given in *Appendix 14.2*.

3.1.3 The above prediction and assessment methodologies would continue to be used in the design and implementation of the scheme. The prediction and assessment methodologies set out in the *NIR* would be used to estimate which properties may become eligible for noise insulation work or a grant in accordance with the *NIR*. Properties that may qualify under the regulations are indicated in *Chapter 14 of the ES*.

3.2 Definition of a significant noise effect

3.2.1 There are no definitive criteria set out in regulatory standards or legislation for the rating of significant noise effects. The Highways Agency has considerable experience in the design and assessment of trunk road projects, including the preparation of environmental statements in accordance with relevant legislation. This experience has been used to define how likely significant noise effects would be determined. This is explained in full within *Chapter 14 of the ES*, in *Appendix 14.3* and is summarised in the following paragraphs.

3.2.2 The identification of significant noise effects is dependent on an assessment of likely noise levels and changes in levels, an understanding of communities, and within them an understanding of individual receptors and their use (hence the receptor's sensitivity to any noise impact which may be experienced).

3.2.3 The approach used to determine the significance of any noise effects due to the scheme is set out below. The application of this approach is also described in *Chapter 14 of the ES.*

3.3 Significance criteria

3.3.1 *Table 3.1* presents observed adverse effect levels for the A14 as set out in the *Chapter 14 of the ES* in response to government policy.

Table 3.1: Thresholds of potential effects of operational noise at residential buildings in terms of government policy

Effect threshold (residential)	Threshold values (freefield)
Lowest Observed Adverse Effect Level (LOAEL)	Day 50dB$L_{pAeq,16hr}$ (equivalent to 52dB$L_{pA10,18hr}$) Night 40dB$L_{pAeq,8hr}$
Significant Observed Adverse Effect Level (SOAEL)	Day ≥68 dB $L_{pA10,18hr}$ façade (equivalent to 63dB$L_{pAeq,16hr}$, freefield) Night >55dB$L_{pAeq,8hr}$

3.3.2 Every residential property where the forecast noise levels exceed the relevant SOAEL is considered likely to experience a significant adverse effect. This is a level where noise would materially disrupt activities inside a property. The noise insulation regulations align with the SOAEL values and the provision of noise insulation therefore avoids significant observed adverse effects.

3.3.3 The change in noise criteria in *Table 3.2* are used to determine the magnitude of noise effects (both adverse and beneficial) where the level of highway noise for the scheme is between the LOAEL and SOAEL values in *Table 3.1*. This is an initial indicator of a potential significant effect.

Table 3.2: Assessment of magnitude and potential significance of impacts from traffic noise

Change in noise change (dB(A))	Initial indicator of significance
+5 or greater	Potentially significant increase
+3 to +4.9	
+1 to +2.9	Unlikely to be significant
+0.9 to -0.9	Not significant
-1 to -2.9	Unlikely to be significant
-3 to -4.9	Potentially significant decrease
-5 or less	

3.3.4 Likely significant effects (beneficial or adverse) associated with changes in noise outside affecting community areas are identified using the following factors.

Residential receptors:

- the magnitude of the effect due to noise change (*Table 3.2*) and the overall noise level;
- number of receptors subject to the noise effect;
- the proportion of the community within which the receptors reside that is subject to the effect; and
- existing absolute noise levels, particularly very noisy and Quiet Areas (as defined in the *ES*).

Non-residential receptors:

- receptor use (e.g. educational, healthcare, religious buildings, community facilities or commercial) and hence their sensitivity to noise (with reference to relevant guidance, for example, from British Standards);
- the times of use;
- the design of the receptor, particularly windows, doors and ventilation systems and hence ability of the receptor to experience increased external noise without significantly effecting internal noise conditions;
- the magnitude of the effect (*Table 3.2*); and
- existing noise levels inside the receptor as well as outside.

3.4 Assessment of ground-borne vibration effects

3.4.1 *DMRB HD213/11* (Highways Agency *et al.,* 2011) states that there is no evidence to suggest that traffic induced ground-borne vibration is a source of significant damage to buildings. *DMRB HD213/11* (Highways *Agency et al.,* 2011) also advises that such vibrations are unlikely to be important when considering disturbance from new roads. An assessment is only necessary in exceptional circumstances. With regard to vibration, no such exceptional circumstances are considered to exist for the operational phase of the scheme.

4 Monitoring and maintenance

4.1 Monitoring

4.1.1 The prediction and assessment methodologies set out in *section 3 of this appendix* would be used as necessary to support the verification of the effectiveness of mitigation measures.

4.1.2 Where access is required onto private land for monitoring purposes, prior consultation would be undertaken with the occupier and appropriate arrangements would be made to enable the monitoring to be undertaken.

4.1.3 As explained in *section 3 of this appendix*, the Highways Agency has a duty under *regulation 6 of the NIR* to assess noise levels following the opening of the scheme to traffic. The purpose of this is to establish the buildings which previously did not qualify for an original offer of carrying out or making a grant in respect of carrying out noise insulation work, but which would have become eligible by virtue of increased traffic flow. Assessments would be carried out in accordance with the obligations set out in the *NIR*.

4.2 Maintenance works

4.2.1 The Highways Agency manages and maintains the trunk road network in accordance with the responsibilities set out in the *part 2 of the Highways Act 1980*. This includes carrying out day-to-day inspections, management, maintenance and repairs to the trunk road network.

4.2.2 The Highways Agency would manage and maintain the trunk roads which form part of the scheme in accordance with the obligations set out in the *Highways Act 1980*. Such management and maintenance would include the on-going implementation and maintenance of mitigation measures provided in accordance with this policy.

4.2.3 Where mitigation measures provided in accordance with this policy form part of roads which become the responsibility of local roads authorities, as set out in DCO, the local roads authority would be responsible for managing and maintaining these parts of the scheme in accordance with their responsibilities set out in *part 1 of the Highways Act 1980*.

4.2.4 The Highways Agency would be responsible for rectifying any defects found to be present in roads which are part of the scheme which become the responsibility of the local roads authority for a period of five years following the scheme being opened to traffic. Should any defects be found during this period, including any defects in mitigation measures provided in accordance with this policy, these would be rectified by the Highways Agency.

5 Bibliography

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