M1 Junction 19 Improvement

Environmental Statement

Volume 2

Chapter 6 Noise and Vibration

Final

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6.1 INTRODUCTION

6.1.1 This chapter presents an assessment of the impact of road traffic noise and vibration for the Preferred Route for the M1 Junction 19 Improvement and evaluates the noise benefits and disbenefits. It considers the impacts of both the construction of the proposed improvement and the operational use of the completed junction. It is one of nine chapters dealing with the environmental topics set out in the Design Manual for Roads and Bridges (DMRB) Volume 11, Environmental Assessment [1] which, together with an introductory chapter, comprise Volume 2 of the Environmental Statement for the proposed improvement.

6.1.2 The study area includes all properties and sensitive locations within 600 metres of the proposals. In addition, properties along the corridor of other roads in the wider network beyond this limit, that are expected to experience changes in noise level due to significant changes in traffic flow, i.e. +25% / - 20% have also been included. The extent of the study area is illustrated by Figure 6.1.

6.1.3 The improvement of this junction would provide new free-flow links between the M6 and A14 and between the M1 north of the junction and A14 and would maintain the current free-flow connections between the M6 and M1 south of the junction.

6.1.4 Alterations are also proposed to the Local Road Network (LRN) to remove local traffic from the motorway junction and to provide an alternative route for this traffic between Catthorpe and Swinford, and between Swinford and the A5.

6.1.5 The Preferred Route is illustrated by Figure A that is bound into Appendix 1 of Volume 1. A detailed description of the proposals for the Preferred Route is given at Volume 2, Chapter 4 Landscape Effects.

6.1.6 The Preferred Route is based upon the Red Junction and Orange Local Road Network that was considered as one of the Options for the Public Consultation in 2008 and assessed in the Comparative Environmental Assessment carried out in 2007 [2].

6.1.7 In common with other Chapters the Noise and Vibration assessment recognises that the Catthorpe Viaduct, which carries the M6 to M1 Southbound link over the M1, is being replaced as a maintenance project. The scope of this work includes the replacement of the bridge on a new alignment immediately to the south west of the existing. It also requires the creation of new approach embankments either side of the M1. The work is programmed to begin in June 2010, for completion in November 2011.

6.1.8 The bridge and earthworks either side of the M1 would be retained in the proposed layout for the M1 Junction 19 Improvement, as would the alignment of the M6 to M1 Southbound link east of the M1. To the west of M1 this link would have to be amended to accommodate the proposed M6 to A14 link.

6.1.9 A separate environmental assessment [3] has been carried out for the bridge replacement as a standalone maintenance project.

6.1.10 This EIA for the M1 Junction 19 Improvement takes into account the new bridge both:-

- As part of the existing junction assuming the M1 Junction 19 Improvement is not built, the 'Do Minimum' scenario
- As part of the completed M1 Junction 19 Improvement, the 'Do Something' scenario

6.1.11 In terms of noise and vibration, the replacement of the Catthorpe Viaduct will result in some impacts for nearby properties during its construction in advance of the junction improvement. In operational terms, replacement of the viaduct would not result in any traffic changes and has no effect on the traffic noise assessment presented in this chapter.

6.1.12 These issues are discussed at Section 6.6 Environmental Impact.

Objectives

6.1.13 The objectives of the Environmental Impact Assessment (EIA) are set out in detail in the Scoping Report [4].

6.1.14 The objective for the assessment for noise and vibration is:-

- To reduce noise levels.

6.1.15 In addition there is the following scheme specific objective:-

- Environmental impact mitigation measures should be integrated into the design, particularly in respect of noise reduction and night time pollution in relation to the local villages of Swinford, Catthorpe and Lilbourne.

6.1.16 The project also needs to be considered in relation to the following commitment:-

- Low noise carriageway surfacing is to be provided for all new motorway and trunk road construction – commitment at 2008 Public Consultation.

Interactions

6.1.17 There are interactions between this chapter and other chapters as follows:-

- Chapter 1, Air Quality also deals with the implications of environmental impacts on sensitive receptors such as dwellings.
- Noise effects upon listed buildings have been taken into account in the cultural heritage assessment, Chapter 2.

6.1.18 Care has been taken to avoid significant overlap or double counting of adverse impacts or benefits resulting from the proposals.

6.2 METHODOLOGY

General

6.2.1 In addition to the general guidance on Environmental Assessment in DMRB [1], the Highways Agency also gives more detailed guidance on a range of Environmental Assessment Techniques. In the case of Noise and Vibration assessments, the methodology to be adopted is set out in Volume 11, Section 3, Part 7 of DMRB [5]. This section was updated in August 2008 and may also be referenced as HA 213/08. The guidance given in this document has been followed in the preparation of this assessment of the noise and vibration impact of the proposed improvement to M1 Junction 19.

6.2.2 DMRB [5] includes both a "simple" and "detailed" assessment methodology. As set out in the Scoping Report [4] and in accordance with DMRB guidance, a detailed assessment is required for this project.

6.2.3 In order to establish the extent of the impact of traffic noise, calculations of noise levels have been carried out for affected properties in the vicinity of the proposed junction improvements, and for properties affected by traffic on the existing roads. The actual extent of the noise study area has been determined by the anticipated changes in the traffic flows on affected roads rather than by an arbitrary distance from the improvements.

6.2.4 DMRB [5] requires that noise calculations should be undertaken at each dwelling and other sensitive receptors within 600 metres of the proposed improvements to the highway infrastructure. Within 2 kilometres of the scheme, calculations should also be undertaken at properties up to a distance of 600 metres from any road affected by a change in noise level of more than 1 dB(A) as a result of the scheme on opening. In terms of changes in traffic volume a 1 dB change would correspond to an increase in traffic of at least 25% or a decrease of at least 20%. Beyond 2 kilometres, detailed noise level calculations are not required but an assessment of the impact should be undertaken based upon the changes in the Basic Noise Level (BNL) in the required scenarios on any affected routes.

6.2.5 The study area selected for these assessments has taken into account the requirements of DMRB [5] and extends to include all properties affected by the proposed improvements to Junction 19 or the LRN. It includes the villages/hamlets of Lilbourne, Catthorpe, Shawell, Swinford, Stanford on Avon and Clay Coton where it is anticipated that the distribution of traffic may alter. Isolated properties on the roads between these settlements have also been included.

6.2.6 Figure 6.1 indicates the noise study area. Noise levels have been determined for all properties within this study area and are listed on the schedules of predicted noise levels, Noise Level Data Sheets, given at Appendix A. Traffic flows on the main roads (M1, M6 and A14) beyond the limits of the alterations are substantially unaffected by the proposals and have not extended the study area. Flows on the A5 are also virtually unaffected by the proposals and, for the most part properties along this route have not been included within the study area, although the noise contribution from the traffic on the A5 has been included in the assessment.

6.2.7 In all, some 561 dwellings have been included in the assessment as well as about 40 business premises and other buildings. To consider the overall effects of a highway proposal, it is necessary to compare the noise climate in the vicinity of the road that exists at present with the conditions that would occur in the future with and without the proposals in place. It is normal for the calculation of future noise levels for a new road to be based on the design year, which is up to fifteen years after its opening. The existing ambient or pre-scheme conditions needed for the assessment of possible insulation works and for the DMRB tabulations can normally be represented by the baseline year defined by DMRB as the year of opening.

6.2.8 Four scenarios have been considered. These are:-

- Do Minimum (2014); the noise climate in the baseline year taken as the anticipated Year of Opening 2014 without the proposals.
- Do Something (2014); the predicted effects of the proposals in the baseline year, the Year of Opening 2014.
- Do Something (2029); the predicted effects of the proposals in the Design Year. This is fifteen years after opening, and would therefore be 2029.
- Do Minimum (2029); the noise climate predicted for the Design Year 2029 if the proposals are not built.

6.2.9 The predictions refer to noise levels one metre from the noisiest façade of the building under consideration within the study area around the improvement works and the existing road network. Because noise levels can change with increasing height, the calculations have been performed at 1.5 metres above the ground for single storey buildings and 4.1 metres above ground for two storey buildings. The noisiest façade is defined as the façade with the highest noise level in the Do Something (2029) scenario.

6.2.10 In the case of buildings which are too distant from major roads or too well screened for reliable predictions to be made of their noise exposure, an assessment of these conditions has been made on the basis of the type of area involved.

6.2.11 By tabulating predicted noise levels for the noisiest façade of the buildings under consideration, it is possible to present the results of the noise calculations in a form which enables comparisons of conditions in the presence of the proposals with the Do Minimum conditions. In this way it is possible to establish and demonstrate whether or not the proposals offer a balance of environmental benefit in noise terms and if so the extent of the benefit to or burden on the community as a whole in terms of the numbers of properties affected or relieved and the magnitude of these effects.

6.2.12 On the basis of this objective assessment it is possible to then prepare a subjective assessment of the significance of the overall impact by comparing the magnitude of the objective assessment with the sensitivity of the receptors affected. Guidance on determining value, sensitivity and the criteria for determining the significance of the environmental effects are set out in Appendix B. These criteria and guidance are taken from Volume 11, Section 2 of DMRB [1]. For the purposes of this assessment all dwellings are regarded as *High* sensitivity.

Noise Units

6.2.13 Noise levels are generally presented in terms of dB(A), that is "A weighted" decibels. The "A weighting" is an internationally agreed frequency response generally similar to that of the human ear so that A weighted sound levels in dB correspond reasonably well with what is heard.

6.2.14 Because environmental noise levels can vary continuously, it is necessary to use an index that involves some form of averaging over an appropriate time period to arrive at a single figure estimate of the overall noise level for assessment purposes. The L_{10} index is widely used as such a single figure estimate. The L_{10} is the sound level in dB(A) exceeded for 10% of a quoted time period, and for traffic noise can be taken as an indication of the mean maximum noise level. Other percentile noise indices are sometimes employed to describe other features of the noise climate, such as the L_{50} or average sound level and the L_{90} or mean minimum sound level. These can be of use in describing the range of sound levels experienced in a given noise climate. The L_{90} discriminates against short duration peaks of noise and is consequently considered to provide a reasonable representation of typical minimum levels. It has often been used to describe background noise levels. In recent times there has been a rationalization of noise units and the A weighted L_{10} level may now be designated as $L_{A10,T}$ in dB where T represents the time period of the measurement.

6.2.15 The L_{10} (18-hour) is the average of the values of L_{10} in dB(A) for each of the eighteen hours between 6 am and midnight on a normal working day. This scale is used by Government Departments and the Highways Agency as a representative measure of traffic noise exposure because a good correlation has been demonstrated between this index and residents' average dissatisfaction with existing traffic noise over a wide range of exposures. The revised designation for the L_{10} (18-hour) would be $L_{A10,18h}$.

6.2.16 Another common form of averaging is to consolidate all the variations in a noise climate into a single value known as the L_{eq} or equivalent continuous A weighted sound pressure level. As its name suggests, the L_{eq} is a measure of the acoustic energy of a fluctuating noise climate over a given period expressed as the single continuous noise level having the same energy as the time varying signal. The L_{eq} is widely used as a measure of various types of environmental noise including construction noise. It is also the unit preferred in Government planning guidance. The revised designation for L_{eq} is now $L_{Aeq,T}$ with the time period, T, identified. $L_{Aeq,2s}$ denotes a 2 second L_{eq} while $L_{Aeq,16h}$ would signify a 16-hour L_{eq} value.

6.2.17 The majority of the assessment included in this chapter for operational noise is made using L_{10} (18-hour) values as these are the values provided by the prediction methodology described below. For construction noise L_{eq} levels are preferred.

Prediction Method

6.2.18 The technique employed for the prediction of the traffic noise levels is that set out in the 1988 edition of the Department of Transport's technical memorandum entitled "Calculation of Road Traffic Noise" (CRTN) [6]. The main determinant of road traffic noise is the traffic flow itself and therefore the prediction of L_{10}(18-hour) noise levels for individual properties or locations involves the use of the predicted weekday traffic volumes (AAWT) during the 18-hour period 6 am to midnight.

6.2.19 In addition to the traffic flow it is necessary to consider the effects of a number of other factors in determining the noise level at a particular calculation point. These factors include:-

- The traffic composition expressed as the percentage of heavy vehicles
- The mean traffic speed
- The road gradient
- The type of road surface and texture
- The distance of the calculation point from the road
- The nature of the ground cover between the road and the calculation point
- The nature of any intervening obstructions, such as buildings or topographical features, which cause a limited angle of view of the road

- The shielding effect of any such intervening obstructions
- The shielding effects of any purpose built noise barriers or cuttings forming part of the road design
- Any reflections from relevant surfaces
- The additive effects of noise from more than one road or section of road.

6.2.20 The Basic Noise Level (BNL) from each section of road is calculated, the appropriate corrections for the propagation path and other relevant factors are applied and the combined noise level from all relevant sections of road is determined at each required calculation point.

6.2.21 The actual calculations have been performed using a computer program known as "RoadNoise". This method uses digital mapping information, or a digitizing tablet, to create a three-dimensional model of the road structure, the surrounding buildings and other topographical features. Details of the traffic flow parameters for the various road links and details of the required calculation points are also supplied to the program. From the data the computer then calculates the contribution from each section of the road network and presents the overall noise level for each of the required points. Separate models have been constructed for the Do Minimum and the Do Something conditions so that noise calculations can be produced for all the required scenarios.

Data Used in Calculations

6.2.22 Traffic data used for the noise calculations have been supplied by Jacobs. All flows are for an average weekday and are demand flows based on central growth traffic forecasts using variable trip matrices. The percentages of heavy vehicles have also been supplied and the traffic speeds for the calculations have been based upon the speed limits for the roads in the network using the table given in paragraph 14.2 of CRTN [6].

6.2.23 Maps of the area and the Scheme layout drawings which were used in the calculations were also supplied by Jacobs. Ordnance Survey base plans showing the existing highway alignments have also been supplied.

6.2.24 In the Department of the Environment, Transport and the Regions report “A New Deal for Trunk Roads in England” [7], there is a commitment to reducing traffic noise levels and an undertaking that quieter road surfaces will be specified on new roads and used for future resurfacing works as a matter of course. This is now Highways Agency policy and they have advised that with such low noise surface materials a correction of -3.5 dB(A) may be applied to the levels predicted using CRTN [6] when average traffic speeds are above 75 km/hr. All of the existing highway network in the study area currently has a conventional hot rolled asphalt surface. All the noise calculations in this assessment have therefore been based on the assumptions that, in 2014, all existing roads would have a conventional tarmacadam surface with a 2.0 mm texture depth and that the Preferred Route would be constructed with a low noise surface (LNS) that would meet the current requirements of the Highways Agency’s specification for highway works.

6.2.25 For the alterations to the LRN, however, the surface has not been determined. The noise predictions have therefore assumed that these links would be surfaced with conventional hot rolled asphalt (HRA). This provides a worst case assessment, giving the higher noise levels for these sections of road.

6.2.26 By the design year 2029 it is probable that all of the main roads in this area would have been resurfaced with a low noise surface material in accordance with current Government policy. The noise predictions for the design year (2029) therefore have assumed that all the main roads would have a low noise surface, whether or not the proposals are implemented, but the LRN would remain surfaced with HRA.

Nuisance from Traffic Noise

6.2.27 Various attempts have been made to relate noise nuisance to traffic noise exposure by comparing the results of questionnaire surveys with noise level data. These surveys have shown that although individual responses to traffic noise may vary widely, useful conclusions may be drawn from the average response of a community. People's annoyance is typically determined by asking if they are bothered by traffic noise "very much", "quite a lot", "not very much" or "not at all". The percentage of people bothered very much or quite a lot has then been related to traffic noise levels by a number of surveys. These surveys found a correlation between "steady-state" long-term dissatisfaction and noise level in dB(A) on the L_{10}(18-hour) scale. However, for noise levels below about 55 dB(A) the correlation was less clear, with factors other than traffic flow affecting the dissatisfaction rating.

6.2.28 More recent research has found that community reaction to abrupt changes in traffic flow may be greater than that predicted by studies of "steady state" noise dissatisfaction. With traffic flow changes as small as a 25% increase or a 20% decrease - equivalent to a 1 dB(A) increase and decrease in noise level respectively - people perceived appreciable benefits or disbenefits. This reaction may be sustained for several years but in the longer term the level of dissatisfaction would be expected to converge with that predicted by the "steady-state" models.

6.2.29 The method used in this chapter for rating nuisance is set out in Volume 11, Section 3 Part 7 of DMRB [5]. The method given there is based on the findings of the research referred to above. In summary, the changes in noise nuisance level over the 15 year assessment period for residential properties is determined and tabulated in percentage bands. This assessment is carried out both for the Do Something and Do Minimum scenarios by applying the curves given in DMRB to the calculated traffic noise levels and taking the higher of the predicted nuisance levels for the "steady-state" or "abrupt change" predictions. The resulting tables provide further indication of the overall environmental noise benefits or disbenefits of the option in terms of the relief or worsening of noise nuisance. This methodology is complex because the assessment has to be based on balancing the differences between two sets of changes.

6.2.30 Research has also been conducted into the relationship between sleep disturbance and noise exposure. This has generally revealed only poor correlation between reported awakenings and intrusive events. Road traffic noise levels at night (10 pm to 6 am) are generally lower than daytime levels. Traffic noise at night will tend to consist of short duration incidents at random intervals corresponding to individual vehicle movements. As such, traffic noise at night has very similar characteristics to aircraft noise. A study of the effect of aircraft noise on sleep disturbance concluded that once asleep, very few people living near airports are likely to suffer substantial sleep disturbance. Assuming these results are broadly applicable to night-time traffic noise, then the likelihood of sleep disturbance from traffic noise is relatively unlikely.

Traffic Induced Vibration

6.2.31 DMRB [5] recommends that the environmental assessment of road schemes should include consideration of traffic induced vibration and the nuisance it causes to people.

6.2.32 There are two basic mechanisms by which vibration can be induced in a building by vehicles using a road. The first is that vibration is generated at the point of contact between a vehicle wheel and the road surface and the vibration propagates through the ground and enters the building through its foundations. The second mechanism relies on noise from the road vehicles propagating through the air and directly exciting vibration in the building when it is incident upon it. These two mechanisms are generally referred to as ground-borne and air-borne or noise induced vibration respectively. In both cases the vibration excites resonances in the building structure and, because the fundamental resonant frequencies of buildings and building elements are generally low, the study of traffic induced vibration is usually restricted to frequencies below about 150 Hz. Peak levels of vibration usually occur in the range 50 to 100 Hz.

6.2.33 Vibration can be measured in terms of acceleration, velocity or displacement. For traffic induced vibration measured in peak particle velocity (PPV), a PPV of 0.5 mm/s is just perceptible. Architectural damage to buildings, such as cracking of plaster, is unlikely to occur until a PPV of ten times this value is reached. The structures of buildings are not affected until a PPV of about 10 mm/s is exceeded.

6.2.34 The Transport Research Laboratory has carried out a considerable quantity of research in this area in terms of measurements and subjective reaction to vibration. One of the major conclusions of this work is that the majority of traffic induced vibration in dwellings is caused by low frequency air-borne noise rather than ground-borne vibration. Where ground-borne vibration does cause a problem it is generally related to an identifiable irregularity in the road surface such as a raised manhole cover, a poorly backfilled trench or a crack in the road surface. The current specifications for road surface finish are such that vehicles using a new or altered road are unlikely to generate vibrations large enough to be perceptible on the ground alongside the road or in adjacent properties. Another important feature of ground-borne vibration is that it will attenuate, that is reduce, very rapidly with distance from the road. Consequently ground-borne vibration problems are generally only encountered in buildings that are less than about 10 metres from the carriageway with an identifiable surface irregularity as described above.

6.2.35 The low frequency noise induced vibration levels in a building have been shown to be directly related to the levels of low frequency noise at the façade of the building. It follows therefore that as the road traffic noise levels increase or decrease so the vibration levels can be expected to increase or decrease also. Relatively high levels of noise are required to cause perceptible levels of vibration and the result of this is that noise induced vibration is only likely to be identifiable in the properties closest to heavily trafficked roads where the noise levels will be very high.

6.2.36 Research has shown that increases in vibration nuisance are closely correlated with increases in traffic noise nuisance except that the percentage of people bothered by vibration is lower at all exposure levels. Therefore, for the assessment of road schemes, for a given level of noise exposure the percentage of people bothered "very much" or "quite a lot" by vibration is 10% lower than the corresponding figure for noise nuisance.

6.2.37 In the context of these proposals it is considered that the detailed consideration of the noise levels would generally encompass the assessment of air-borne or noise induced vibration. Ground-borne vibration is unlikely to occur because of the absence of surface irregularities on a new road.

Consultations

6.2.38 Following the preparation of the Scoping Report [4], a consultation meeting was held with the Local Authorities (Harborough District Council, Daventry District Council and Rugby Borough Council) on 27 March 2009 to explain and discuss the proposed scope of the Noise and Air Quality section of the ES for the Preferred Route. This followed an earlier meeting held on 20 August 2008 that had presented the findings of the Comparative Environmental Assessment Report [2].

6.2.39 At this scoping consultation the proposed methodologies were set out and the Local Authorities were invited to comment on the proposals. At the meeting all the consultees confirmed that they were content with the approach proposed.

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6.3 LEGISLATION AND POLICY FRAMEWORK

6.3.1 This section gives details of statutory measures that are available to mitigate the impact of highway proposals and then sets out the regional and local planning policies that are relevant to the consideration of the noise and vibration impact.

6.3.2 The Noise Insulation Regulations 1975 [9] were introduced under the powers of Land Compensation Act 1973 [8] in order to alleviate the noise problems caused by new road projects and to set down standards and criteria for remedial insulation measures. These Regulations have been amended by The Noise Insulation (Amendment) Regulations 1988 [10]. The effect of these amendments is only to revise references to other legislation and to implement the revised edition of Calculation of Road Traffic Noise [6] as the approved calculation procedure.

6.3.3 The Regulations deal with the circumstances relating to noise from the future traffic use of the highway and also with possible noise problems created during the construction works.

Protection from Traffic Noise

6.3.4 The requirements governing qualification for noise insulation works are dealt with in full in The Noise Insulation Regulations 1975 [9] but it is worth detailing the three basic noise conditions which must be satisfied before properties can be regarded as eligible for an offer of insulation works against road traffic noise. These are:-

- The L_{10}(18-hour) noise level must not be less than 68 dB(A) at the time of the highest predicted traffic flow during the 15 year period following the opening of the road to public traffic.
- There must be an increase of at least 1 dB(A) when comparing the future noise level with the existing noise level immediately before construction starts.
- Traffic on the new road must contribute at least 1 dB(A) to the overall future noise level.

6.3.5 To be considered under these Regulations a building must, in addition to the above, be an "eligible building" and the requirements for this are as follows:-

- It must be a dwelling or a building used for residential purposes.
- It must be within 300 metres of the edge of the new or altered highway.
- It must have been occupied prior to the opening to traffic of the new or altered highway.
- It must not be subject to a Compulsory Purchase or Demolition Order or be within a Clearance area.
- It must not be a building receiving grant for Noise Insulation work under any other Statutory Scheme.

6.3.6 Non-residential buildings such as schools, hospitals and non-residential hotels are not legislated for. The insulation provided under this legislation essentially comprises secondary glazing, to form double windows, and the provision of silenced ventilators to all living rooms and bedrooms on the affected façades. Windows and doors to hallways are not covered unless these form an integral part of a living room or bedroom. Such insulation can substantially counteract the adverse effects on the internal domestic noise environment caused by external sources, and can enable a good internal standard to be achieved in many cases despite the proximity of a road.

6.3.7 A preliminary assessment has been carried out to identify whether any dwellings might be eligible for an offer of improved sound insulation and the results are presented in the Mitigation Section below. This assessment should not be considered to be the final determination of eligibility. Subject to the completion of the statutory procedures and the making of the Orders, the Highway Authority would carry out a more detailed study and would publish the Statutory Noise Maps at the appropriate time. At that time the appeals procedure given in the Regulations would become operative.

Protection from Construction Noise

6.3.8 Regulation 5 of The Noise Insulation Regulations 1975 [9] states that the Highway Authority has the power to offer insulation works if construction works are expected to "…cause noise at a level which, in the opinion of the appropriate highway authority, ..will seriously affect for a substantial period of time the enjoyment of an eligible building…". Construction noise cannot be considered in detail until the contractor's schedule is known but the Department for Transport would expect to make use of these powers to provide insulation for residential properties if there are any that would be particularly affected. Eligibility for insulation against construction noise would be determined when the Statutory Noise Maps are being prepared.

6.3.9 Where eligibility for improved sound insulation is established in relation to either construction noise or future traffic noise arising from the use of the road the Department would, wherever possible, carry out the insulation work before construction commences.

Environmental Noise Directive

6.3.10 The European Environmental Noise Directive (END) is implemented in England by The Environmental Noise (England) Regulations 2006 [11]. Under these regulations, Draft Noise Action Plans have been published by the Department for Environment, Food and Rural Affairs (Defra) for consultation in 2009, identifying First Priority locations.

6.3.11 The appropriate Draft Noise Action Plan map has been examined and three First Priority locations are identified along the M1 within the study area for the scheme. These are:-

- Lilbourne Fields Farm,
- Yelvertoft Road, Lilbourne,
- Stonebank,

6.3.12 The next stage in the process is subject o the outcome of the consultation.

Regional Policies

West Midlands Regional Spatial Strategy (2008)

6.3.13 The Regional Spatial Strategy for the West Midlands was adopted in 2008 and includes policies covering Noise and Vibration such as QE3: Creating a High Quality Built Environment. Policy QE3 requires development to assess and minimise the impacts of noise pollution.

East Midlands Regional Plan (2009)

6.3.14 The East Midlands Regional Plan was adopted in 2009 and includes the provision of up to date regional policies. There are no policies relevant to Noise and Vibration.

Local Policies

Daventry District Council Local Plan 1997

6.3.15 The Daventry District Council Local Plan was adopted in 1997. In September 2007 any policies not “saved” expired, there are no saved policies that are relevant to Noise and Vibration. These policies are to be eventually replaced with emerging policies under the Local Development Framework (LDF). Daventry are producing a joint Core Strategy as part of the LDF which is the West Northamptonshire Joint Core Strategy (2007) which is currently at the issues and options stage. This means that any policies are currently only in draft form. As the Core Strategy is currently at Issues and Options Stage there are not yet any policies but the strategy does set out Strategic Objectives which will inform the basis of future policies. Strategic Objective 8 of the Core Strategy aims to ensure that development is sensitive to its environment.

Harborough District Council Local Plan 2001

6.3.16 The Harborough District Local Plan was adopted in 2001 and as mentioned above all policies that were not formally saved expired in September 2007. There is only one saved policy which is relevant to Noise and Vibration which is EV23: Control of Pollution and Nuisance. The policy aims to ensure that development does not have an adverse effect on the character of its surroundings or harm the amenity of adjacent land uses through noise or an unacceptable level of traffic.

6.3.17 Harborough are in the process of producing their Core Strategy which is currently at alternative options stage. Within this document Core Spatial Policy 3: Promoting Sustainable Development is relevant to Noise and Vibration.

Rugby Borough Council Local Plan 2006

6.3.18 The Rugby Borough Local Plan was adopted in 2006 and contains a number of saved policies. Of these saved policies GP3: Protection of Amenity is relevant to Noise and Vibration. The policy requires development to ensure that there are no adverse impacts on amenity caused by noise and disturbance from traffic.

6.3.19 In addition to the saved policies in the Local Plan, Rugby are also in the process of writing their Core Strategy which is currently at the preferred options stage. Within the Core Strategy there are no policies relevant to Noise and Vibration.

North Northamptonshire Core Strategy (2008)

6.3.20 The North Northamptonshire Core Strategy was adopted in 2008 and is a joint Core Strategy covering the areas of Corby, Kettering, Wellingborough and East Northamptonshire. Within this document there are no policies relevant to Noise and Vibration.

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6.4 BASELINE CONDITIONS

6.4.1 As indicated in the Methodology Section above, the noise levels in the anticipated year of opening, Do Minimum (2014), represent the baseline scenario for the assessment of a scheme of this nature. Detailed calculations have been carried out for this scenario for all properties within the study area and the results are presented in detail in the Environmental Impact Section 6.6 below.

6.4.2 Although noise from the major roads in this area (M1, M6 and A14) is audible throughout most of the study area it is clear that the noise levels at individual properties that would be subject to change with the proposals are due, in most cases, to the traffic on the LRN adjacent to the property. The impact of noise for this scheme is therefore primarily related to the traffic noise from the LRN and the changes that would occur in the distribution of this traffic, rather than the physical alterations to the junction itself.

6.4.3 Tables 6.1 & 6.2 provide an objective assessment of the baseline conditions in terms of the numbers of properties in the study area that would be exposed to noise levels in 3 dB(A) wide bands for the Do Minimum (2014) and Do Minimum (2029) scenarios.

Table 6.1 : Year 2014 Do Minimum

Numbers of properties within each noise level band, L_{10}(18-hour) dB(A)

Property Type	<47.5	47.5 - 50.4	50.5 - 53.4	53.5 - 56.4	56.5 - 59.4	59.5 - 62.4	62.5 - 65.4	65.5 - 68.4	68.5 - 71.4	71.5 - 74.4	74.5 - 77.4	77.5 - 80.4	80.5 - 83.4	≥83.5
Houses & Flats	5	13	36	88	127	122	112	34	15	6	3			
Businesses & Shops		2	3	4	6	4	6	5	1					
Other Facilities			3	3	3	1	1	1						

Table 6.2 : Year 2029 Do Minimum

Numbers of properties within each noise level band, L_{10}(18-hour) dB(A)

Property Type	<47.5	47.5 - 50.4	50.5 - 53.4	53.5 - 56.4	56.5 - 59.4	59.5 - 62.4	62.5 - 65.4	65.5 - 68.4	68.5 - 71.4	71.5 - 74.4	74.5 - 77.4	77.5 - 80.4	80.5 - 83.4	≥83.5
Houses & Flats	5	19	55	107	149	82	72	53	13	4	2			
Businesses & Shops			8		8	4	4	5	2					
Other Facilities		1	2	4	2		3							

6.4.4 It can be seen from these tables that the majority of residential properties in this study area have L_{10}(18-hour) noise levels in the range 54 to 65 dB(A). Table 6.1 shows that in the Do Minimum (2014) scenario there would be 58 residential properties with noise levels of 65.5 dB(A) or more and 9 of these would be exposed to levels of 71.5 dB(A) or more. At the time when The Noise Insulation Regulations were introduced, the Noise Advisory Council described 70 dB(A) as being "the limit of the acceptable".

6.4.5 Between 2014 and 2029 there would be growth in traffic on the network that would be expected to increase noise levels by typically 1 or 2 dB(A), but this would be offset by the introduction of a low noise surface on the main roads. There would also be some rerouting of traffic due to congestion at critical points in the network. Table 6.2 shows that with the Do Minimum (2029) scenario there would be similar exposure in the higher noise level bands with 72 residential properties with noise levels of 65.5 dB(A) or more and 6 exposed to 71.5 dB(A) or more.

6.5 MITIGATION

Construction

6.5.1 It is inevitable that the process of constructing a highway scheme could give rise to some temporary impacts. Site management and mitigation measures during the construction period would be set out in the Construction Environmental Management Plan (CEMP) to reduce, or where possible, eliminate construction impacts. These measures would take the form of constraints on the contractor in connection with his access to the site including designated haul routes, working hours and methods. These would be discussed in more detail with the local planning authority, Harborough District Council, before work begins on site.

6.5.2 The site management and mitigation measures to reduce the exposure to noise and vibration that would be an integral part of the CEMP are likely to include the following:-

- Where noisy tasks are to be undertaken affecting residential or other occupied buildings, the occupiers would be given advance notice explaining the reason for the works, the expected time and duration, and the procedures for minimising the noise or vibration.
- Where work has to be undertaken during either the evening or night-time periods, the Contractor would advise and consult with the relevant Local Authority in accordance with an agreed procedure.
- All plant and equipment associated with the construction works would be properly maintained, provided with effective silencers and operated in such a manner as to avoid causing any excessive noise emission. Where plant has been designed to operate with engine covers to reduce noise, these would be used and remain closed while the plant is in operation. The noise emitted by each item of plant in normal use would not exceed the levels quoted in BS 5228. Unless otherwise directed by senior construction management, items of plant in intermittent use would be shut down during idle periods.
- Static plant would be located in areas as far as possible from sensitive receptors, including inhabited buildings, and would be screened where practicable. Plant known to emit noise predominantly in one direction would, when possible, be screened or orientated so that the noise is directed away from noise sensitive areas.
- Any compressors brought on to site would be silenced or sound reduced models fitted with acoustic enclosures. The doors to such enclosures should be kept closed during operation.
- Care would be taken when erecting or striking scaffolds to avoid impact noise from banging steel. All operatives undertaking such activities should be instructed on the importance of handling the scaffolds to reduce noise to a minimum.
- Audible warning systems, such as vehicle reversing sirens, would normally be switched to as low a setting as is compatible with safety requirements. Where possible, the latest low volume, broadband warning systems, audible only immediately to the rear of vehicle or plant item, would be employed.
- Within site compounds, where possible and beneficial, site buildings would be situated to provide additional screening between the works and other occupied premises.
- Where appropriate, the stockpiling of site materials, soil or spoil would be located where it can provide some additional screening provided that any plant associated with this would not in itself generate nuisance and provided that prevailing wind conditions would not increase the potential for nuisance due to dust.
- The transport of materials on or off site by road would take place during the normal daytime working period and where possible would also be routed away from sensitive

receptors. Deliveries would be programmed to arrive during daytime hours where possible. Care would be taken when unloading vehicles to minimise noise. Delivery vehicles would be routed so as to minimize disturbance to local residents and would be prohibited from waiting on the highway or within the site with their engines running.
- Contractor vehicles would be prohibited from travelling through the villages of Lilbourne, Swinford, Catthorpe, Shawell and Welford.
- Site personnel would be informed of the agreement with the Local Authority regarding the need to minimise noise to the neighbouring community as well as about the health hazards of exposure to excessive noise or vibration. Their training would include advice relating to the proper use and maintenance of tools and equipment, the positioning of machinery on site to reduce noise emissions to neighbouring communities, and the avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment. This would be critical if works have to be undertaken during early morning, evening or night-time. No radios or music would be played on site.
- Potential damage to buildings from vibration has been considered using British Standard BS 7385 and it has been concluded that neither the bored or sheet piling nor any other proposed construction activity would be likely to cause any vibration issue with local commercial and residential premises.
- The Contractor would select and utilise the best practicable method of working and optimum item of plant so that vibration levels would not exceed limits as may be agreed with the relevant local authority.

6.5.3 With respect to communicating with local residents and as part of the Public Relations strategy, a telephone number would be advertised so that any member of the public can call with queries or concerns about the construction works.

6.5.4 With the mitigation measures described above, it is likely that noise and vibration levels would be maintained within the range agreed with the local authority. However, perceptible construction noise at any level, may still comprise a nuisance to the occupants of residential and other sensitive properties within the area for limited periods of time.

6.5.5 As set out in the Legislation Section above, under The Noise Insulation Regulations 1975 [9] (as amended in 1988 [10]), noise insulation may be offered to any properties where construction noise "seriously affects for a substantial period of time the enjoyment of an eligible building adjacent to the site on which the works are being carried out". A further detailed assessment would need be carried out in advance of construction to identify properties that may be eligible for insulation against construction noise, although, given the distances to the nearest properties, it seems unlikely that any property would be eligible.

Operational

6.5.6 Introducing improvements to a major junction and altering the LRN would inevitably have some impact on the noise environment of the surrounding area. Every effort has been made in the design of the Preferred Route to keep the noise impact to the minimum by keeping road elements with the highest traffic flows as low as possible and making use of cuttings where practical. There are very few residential properties that are close to the proposed alterations. Those that are will continue to be exposed to traffic noise from this important junction but would receive some benefit from the low noise surface material that would be used on the new and altered highway sections. Low noise surface is anticipated to result in a reduction of 3.5dB(A) compared with existing conventional hot rolled asphalt surface. Such benefits would also occur eventually without the junction improvement as it is policy to provide low noise surface as part of ongoing maintenance works.

6.5.7 No other specific noise mitigation measures are proposed because noise barriers are not a cost effective solution for providing protection to isolated properties. Although the Environmental Master Plan, Figure B in Appendix 1 to Volume 1, includes some sections of earth mounding, this is proposed for visual screening not noise reduction, Most of the properties that would be affected by changes in noise level are on road links on the local network that are affected by the redistribution of the local traffic and where noise barriers or other physical protection measures would be inappropriate or impossible to implement.

6.5.8 As indicated in the Legislation and Policy Framework section above, a preliminary assessment has been carried out to determine whether any dwellings might be eligible for an offer of improved sound insulation under The Noise Insulation Regulations 1975 [9] as amended in 1988 [10]. At the present stage it would appear that there are no properties that would be eligible for offers of insulation against traffic noise under The Noise Insulation Regulations 1975 [9] as it is likely that neither the requirement for a 1 dB(A) increase in level nor the 1 dB(A) contribution from the improved highway would be achieved in this case. The study that has been carried out here should not be considered to be the final determination of eligibility but is, however, sufficiently detailed to assess the likely effects of the improvement at this stage.

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6.6 ENVIRONMENTAL IMPACT

Construction

6.6.1 As set out in the Introduction, the replacement of the Catthorpe Viaduct will be carried out in advance of these proposals and a separate Noise and Vibration assessment [3] has been prepared. That assessment showed that the magnitude of the impact of the construction of the replacement viaduct was assessed to be *Minor Adverse*. This section sets out the impacts of the construction of the remainder of the junction including the works required to tie the new layout into the replaced viaduct.

6.6.2 It is inevitable that the construction of a scheme of this nature would give rise to some temporary impacts. During the construction period, increased noise levels at residential properties could result from plant, machinery and on-site construction activities. In addition there could be further impacts arising from traffic diversions. Noise and vibration disturbance due to construction is generally a more localised phenomenon than the operational effects of the scheme after opening and is temporary in nature.

6.6.3 There are two areas of activity involved; the construction of the main junction improvement itself and the alterations to the LRN.

6.6.4 For the main junction improvement works the activities that are most likely to be the cause of disturbance to the public include:-

- Site compound set up and operation
- Structures
- Earthworks
- Demolition

6.6.5 For the proposed site compound on Rugby Road, Swinford, illustrated on Figure G in Appendix 1 to Volume 1, topsoil stripped from the site could be used to provide mounding round the perimeter to reduce noise emission from the site. Other than this process, there would not be any other specifically noisy activities during the set up phase. Most of the noise during the operation of the site would be from the delivery and storage of materials and some maintenance activity on plant and machinery. In this respect the site compound would be comparable in noise terms to a typical commercial or industrial site involving haulage. All vehicular deliveries would be required to be made via approved routes and at times to minimise the impact on residential property.

6.6.6 The proposed site haul routes also illustrated on Figure G would provide access around the periphery of the works. They would, however, be adjacent to live carriageways of the junction complex and the numbers of vehicles would be very small in comparison with the existing road traffic movements on the main road network. Analysing the Contractor’s construction sequence proposals it can be seen that the construction of the new embankment for the M6 to M1 Southbound Link west of the M1 would be when the use of the haul roads will be most intensive with a maximum of 148 heavy vehicle movements per day on the haulage routes within the junction. This would be equivalent to a 0.2% increase in traffic on the M1 northbound for example. There would be noise from the heavy vehicles using these routes but these would have a negligible impact in the context of the overall traffic noise levels at the junction. The placement of the fill material would be in locations adjacent to the highway network and associated noise emission would occur against an existing high ambient noise level.

6.6.7 These proposals involve the construction of new bridge structures within the heart of the existing M1 Junction 19 complex. The likely sources of noise would involve piling operations for foundations, concrete pouring and compaction, delivery of materials and cranage for lifting shuttering and beams. The impact of these activities is likely to be substantially masked by high levels of traffic noise emanating from the adjacent highway. Less significant activities (in terms of noise) at the periphery of the site include the bridge works for the M1 at Shawell Road and the M6 at Shawell Lane.

6.6.8 A number of existing bridges would be demolished as part of the works which would inevitably involve noisy processes but the durations would be relatively short, and, even with temporary closures of some of the major roads, would still occur in the context of traffic noise from the remaining highway network.

6.6.9 Activities related to the construction of the LRN would be relatively small scale and would not involve any major structures. Such activities do not usually give rise to significant noise impacts except for property immediately adjacent to the works.

6.6.10 There are relatively few residential properties close to the proposed works. The Contractor Skanska have provided AIRO with a list of plant/machinery for each separate site activity (earthworks, structures, drainage etc.) and where appropriate, noise levels for each item of plant/machinery have been obtained and used to predict noise levels at affected properties. Where noise level predictions have been made, a worst case scenario has been used i.e. all listed plant/machinery operating simultaneously at the closest site boundary to the affected dwelling. The following identifies properties between 100 - 150m of some element of the works that could potentially be at risk. Their locations are illustrated on Figure 6.1 The activity that could affect the property is set out along with a comment on the magnitude of the impact using the criteria set out in Appendix B:-

- 1 and 2 Catthorpe Road, Shawell, adjacent to the realignment of Catthorpe Road. It is considered there would be a *Minor Adverse* impact on these properties from the works.
- Hill Top Farm, Swinford Road. A *Minor Adverse* impact by works which would be required to tie-in and realign the LRN to Shawell Road.
- Tomley Hall Farm, a *Minor Adverse* impact from aspects of the main junction improvement and new LRN link.
- Stonebank Properties consisting of three mobile homes adjacent to M1. The closest property to the works is approximately 50 metres from the proposed earthworks for the A14 to M1 northbound slip road. Assuming that all of the plant/machinery listed by Skanska for earthworks is simultaneously operating at the closest point of the site to the property, the noise level contribution from the earthworks would be 80 dB. This noise level is 3 dB higher than the noise level contribution from the road network in Do Minimum 2014 and as a result is assessed as a *Moderate Adverse* impact. The nearest structures activities to the Stonebank property, approximately 200 metres away, would create a noise level at the property of 63 dB and therefore would not contribute to the overall noise level created by the road network and the earthworks.
- Westfield Lodge. On Rugby Road adjacent to the proposed site office compound. This property is likely to be subject to some impact from the compound due to proximity - a *Minor Adverse* impact.
- Brookside. On Rugby Road but screened from the site compound by the Westfield Lodge complex. Unlikely to be affected by the site compound due to the screening. Noise level contributions from earthworks and structures activities on site are predicted to be 61 and 58 dB respectively. Given that the noise level contribution from the road network in Do Minimum 2014 at Brookside would be 65 dB, against the

background of traffic noise from the motorways there is likely to be a *Minor Adverse* impact.

- Old Barn Farm. Approximately 150 metres from the nearest earthworks and structures activities for the M1-M6 Northbound Link. The noise level contributions from the earthworks and structures activities are calculated to be 68 and 66 dB respectively. Given that the noise level contribution from the road network in Do Minimum 2014 at Old Barn Farm would be 70 dB, against this background of traffic noise from the motorways, there is likely to be a *Minor Adverse* impact.
- Lambcote Hill Farm would lie just over 100m away from proposed works to reconstruct Shawell Road M1 overbridge. Although already close to existing noise from the M1 in cutting at this location these works are likely to have a *Minor Adverse* impact on this property.

6.6.11 Construction activity may well be audible at other properties in the study area but it is unlikely that the levels would be high enough to present a significant impact.

6.6.12 A speed restriction would be imposed on the highways affected by the proposed works and this would result in a general reduction in traffic noise from the junction area during the construction period. This would be a benefit for the properties closest to the works.

6.6.13 Some operations would have to be undertaken at night, however, these would be kept to a minimum. Particularly noisy operations such as piling and demolition works would be avoided at night where possible.

6.6.14 Construction noise thresholds would be adopted at individual properties using relevant guidance and would be subject to agreement with the local planning authority, Harborough District Council.

Potential Impacts from Temporary Diversions

6.6.15 Skanska have provided an outline of the traffic management and construction sequence proposals which identifies several full and partial closures of the M1, M6 and A14 at various stages in the construction process. This would impose additional traffic on diversionary routes such as the A426 and A5 and could give rise to a *Minor Adverse* impact for residential properties along these routes.

6.6.16 A further issue for consideration is the temporary diversions that would be required after the access to Junction 19 is closed to local traffic. The temporary increase in traffic through the local network would be likely to have some impact in noise terms and the most sensitive receptors on any of the potential diversion routes would be the village of Shawell.

6.6.17 In the absence of a detailed traffic model during the construction period, it is not possible to make accurate predictions of the changes, but some assumptions can be made on the basis of the ‘Do Minimum’ assessments that are available in the traffic model for the LRNs.

6.6.18 As a worst case scenario, it has been assumed that all of the traffic that would usually travel directly between Catthorpe and Swinford would divert through Shawell. Based on traffic flows for Do Minimum 2014, Catthorpe Road through Shawell would see an increase in traffic from 3471 vehicles per 18 hour day with 2% heavy vehicles to 6145 vehicles with 2% heavy vehicles. This is an increase of 89% which would be expected to give rise to a 3 dB increase in noise level through the village. This is assessed as a *Moderate Adverse* impact.

6.6.19 There would also be temporary changes in traffic flows in Swinford with reductions along Rugby Road and High Street but increases along North Street, Lutterworth Road and Shawell Road. The overall impact in Swinford, however, is probably *No Change*.

Overall Impacts During Construction

6.6.20 The noise impact during the construction period has been set out above. There is unlikely to be any significant vibration impact arising from the junction improvement works due to the relatively large distances between the works and even the closest properties.

6.6.21 The overall magnitude of the impact of noise and vibration during the construction period for the proposed M1 Junction 19 Improvement is considered to be *Minor Adverse*.

Operational

6.6.22 The assessment of the impact of the operational use of the Catthorpe Viaduct Replacement [3] considered that there would be *No Change* in the magnitude of the impact.

6.6.23 The following sections set out in detail the operational impacts for the remainder of the Preferred Route for the M1 Junction 19 Improvement that would tie into the replaced structure.

Presentation of Results

6.6.24 For the purposes of this chapter the following terminology will be used to describe the various years and scenarios considered. Conditions without the proposals will be termed the Do Minimum (2014) for the year of opening and Do Minimum (2029) for the design year. Conditions with the proposals will be described as the Do Something (2014) and Do Something (2029) for the two years respectively.

6.6.25 Appendix A contains a series of Data Sheets that provide a schedule of predicted noise levels for individual properties or groups of properties within the study area.

- Data Sheet 5527/Key 1 provides some explanatory notes.
- Data Sheets 5527/EA/Area_/1 to/29 list the noise levels for the Do Minimum and Do Something in both the year of opening 2014 and design year 2029.

6.6.26 Some properties have noise levels presented for more than one façade where the exposure differs on different sides of the building, or where different traffic noise sources affect the building. However, in the summary tabulations that follow each property is only counted once and the most exposed façade that contains a window has been used to categorize it. There are properties for which traffic noise would not be the major contributor to their background levels and a simple prediction of the traffic noise level would give an erroneous value. In these situations an assessment has been made of the background noise levels based on the type of area involved. The predicted traffic noise levels are then compared with the assumed background noise level for the impact assessment. Where an assumed background noise level has been used this is indicated on the Data Sheets with the abbreviation ‘Amb’.

6.6.27 In assessing the overall noise impact of a new road proposal it is necessary to consider both the noise levels that people would be exposed to and the changes in level that would occur. The following section describes the effect that the proposals would have in environmental noise terms. This is then followed by an overall analysis using tables which give the number of properties in 3 dB(A) wide noise level bands for the Do Minimum and Do Something scenarios in both the year of opening and the design year. Further tables then give the number of properties exposed to various changes in noise level. In describing the impact of the noise change that would affect a property, use is made of a number of specific adjectives that have been assigned to bands of noise level change in DMRB [5]. These adjectives and the changes that they represent are set out in Table 6.3.

Table 6.3 : Guide to Sound Level Changes

Band of Change in Sound Level dB(A)	Adjectives used in chapter
0	No Change
0.1 - 0.9	Negligible
1.0 - 2.9	Minor
3.0 - 4.9	Moderate
≥5.0	Major

Impacts of Traffic Noise from the Preferred Route

6.6.28 The Data Sheets in Appendix A give the noise levels for all the properties in the study area.

6.6.29 In the following description, unless otherwise indicated, comparisons are made between the noise levels in the Do Minimum and Do Something scenarios in 2029. In this way, equivalent traffic growth and common road surface assumptions are included. This should provide the clearest indication of the direct impact of the proposals. Because the DMRB [5] assessment methodology uses comparisons between the Do Minimum in the year of opening and the two design year scenarios, these comparisons are additionally set out where it is considered that this would be of assistance.

6.6.30 Dwellings with *Moderate* and *Major* changes in noise levels comparing the Do Minimum and Do Something scenario in the Design Year 2029 are illustrated on Figure 6.2 and scheduled at Appendix C.

Lilbourne

6.6.31 Lilbourne Fields Farm is south of the limits of the Scheme and is relatively exposed to noise from the M1. It would have a level of 72 dB(A) on its western façade in the Do Something (2029), unchanged from the Do Minimum (2029) but 3 dB(A) lower than the Do Minimum (2014). This reduction arises from the introduction of the Low Noise Surface before the design year for the junction improvement. As set out in Section 6.3 this property has been identified in the Draft Noise Action Plans as a First Priority location.

6.6.32 The northern façades of properties along Yelvertoft Road are at the top of the M1 cutting and have Do Something (2029) noise levels that are over 70 dB(A) for those closest to the M1. These properties would have *No Change* in level compared with Do Minimum (2029) due to the introduction of the proposals but *Minor* reductions of 2 dB(A) compared with Do Minimum (2014) arising from the introduction of the low noise surface. Properties on Yelvertoft Road have also been identified in the Draft Noise Action Plans as First Priority locations.

6.6.33 The eastern façades of the properties along Station Road would have lower levels than the Yelvertoft Road properties, typically 62 to 67 dB(A), with the majority of properties having *No Change* compared with Do Minimum (2029) and some having *Minor* reductions of 1 dB. The outlying properties along the road towards Catthorpe, near to the church, would have similar noise levels and a similar pattern of change.

6.6.34 Although some of these properties have noise levels over 68 dB(A) they would not be eligible for insulation under The Noise Insulation Regulations 1975 [9] because they do not have an increase in level from the Pre-Scheme conditions.

6.6.35 Other properties in the village that front directly onto the local roads would have *No Change* in level between Do Minimum (2029) and Do Something (2029) but would have reductions compared with the 2014 scenarios due to anticipated reductions in flow on the LRN during this period. However, the situation is not always as clear-cut as this because the M1 may still be contributing to the overall noise levels and may be contributing to the pattern of noise level change. The outlying properties along Yelvertoft Road towards Clay Coton are away from the influence of the M1 and would have *Minor* reductions in noise level in 2029 compared with 2014 due to reductions in traffic along this road.

Catthorpe

6.6.36 In this area, Old Barn Farm is the closest property to the junction. The south east façade is the most exposed overall. The Do Something (2029) noise levels on the south east façade would be 66 dB(A), no change compared with Do Minimum (2029) but a *Moderate* reduction compared with 2014. As with the Lilbourne properties that are close to the M1, Old Barn Farm would not be eligible for mitigation under The Noise Insulation Regulations 1975 [9] because it would not reach the 68 dB level in 2029 nor would it have an increase from the Pre-Scheme noise levels.

6.6.37 The Latvian Welfare Centre at Catthorpe Manor is also relatively close to the M1. The Manor building itself would have Do Something (2029) noise levels on the northeast façade of 64 dB(A), with *No Change* from the Do Minimum in the same year but a *Minor* 2 dB(A) reduction compared with the Do Minimum (2014). This indicates that the changes in the layout of the junction are not having a noticeable effect on the noise exposure of this property but that the change in the road surface material is more than offsetting the increases in level due to growth in traffic over the 15 year design period. The bungalows on the northern side of this site have noise levels that range from 59 to 63 dB(A) in Do Something (2029), the same as or only a *Negligible* increase compared with the Do Minimum (2029) levels.

6.6.38 For the properties in the village itself there are two distinct sources of noise, the distant motorways and the local roads adjacent to the property. Depending on the orientation of the property façades and the proximity to the local road the exposure may be quite different. Manor Farm is probably typical of a number of properties along Rugby Road and Main Street. The southern façade of this property would have a *Major* reduction in level from 63 dB(A) in Do Minimum (2029) to 55 for the Do Something in the same year. This is due only to the anticipated reduction in traffic on the local road through the village. Benefits from a low noise surface do not apply in this case because no change in surface material has been allowed for on the LRN. Properties set back from the local roads may be more exposed to the noise from the motorway network. The northeast façade of 1 Hermitage Close, for example, would have 58 dB(A) in Do Something (2029), *No Change* compared with the Do Minimum (2029) level but 2 dB(A) lower than the Do Minimum (2014).

Shawell

6.6.39 As with the other villages, the motorway network and the LRN are both contributors to the noise impact. The eastern façades of properties in Main Street, such as The White Swan PH, would have Do Something (2029) noise levels of 52 dB(A), 2 dB(A) lower than the Do Minimum (2029) scenario and 3 dB(A) lower than the Do Minimum (2014). At these sorts of distances, the change in the junction layout would not have any effect of the noise exposure. The change is due only to the combination of the increase in traffic volume over the 15 year period and the adoption of low noise surfacing on the main roads.

6.6.40 For Catthorpe Road, the majority of the properties are on the east side of the road. Noise levels on the eastern façades are due to the motorway network and exhibit the same pattern as the Main Street properties although levels are marginally higher, probably because of a reduction in screening by the village itself. The western façades, however, generally have lower Do Something noise levels than the eastern sides due to the traffic on the LRN that reduces with the proposals in place.

6.6.41 1 and 2 Catthorpe Road (OS Plot 5713) are isolated properties on the north side of Catthorpe Road but near to the M6. In the Do Something (2029) scenario the noise level of 67 dB(A) is a *Moderate* 3 dB(A) higher than in Do Minimum (2029) and a *Minor* 1 dB(A) higher than in Do Minimum (2014). In the design year (2029) of the scheme the existing sections of the M6 road surface would have been replaced with a Low Noise Surface which is the reason for the Do Minimum noise levels decreasing from 66 to 64 dB(A) from 2014 to 2029. However, due to the introduction of the new local link road between Shawell Lane and Rugby Road and hence the associated predicted increase in traffic on the local roads, the benefit of the Low Noise Surface is lost for Do Something (2029).

6.6.42 Tomley Hall Farm is affected by both the M6 and M1 and would overlook the junction improvement. The noise levels for the Do Something (2029) scenario would be 62 dB(A), a *Minor* 1 dB(A) increase compared with the Do Minimum (2029) level of 61 dB(A) but a *Minor* 2 dB(A) reduction compared with Do Minimum (2014).

6.6.43 Within the site known as Stonebank there are three occupied residential caravans that are exposed to Do Something (2029) noise levels between 67 and 75 dB(A). These dwellings typically show *Minor* increases compared with Do Minimum (2029) but *Minor* decreases compared with Do Minimum (2014). As set out in Section 6.3, this site is identified in the Draft Noise Action Plans as a First Priority location.

Swinford

6.6.44 Although the main road network has a distant impact on Swinford as a whole and the south and west margins in particular, the majority of the noise exposure on property in Swinford is from the traffic on the local roads through the village. The noise impact, therefore, depends almost entirely on the changes in the traffic flows on these roads. Webster Farm on Lutterworth Road would have noise levels on its south façade of 59 dB(A) in the Do Something (2029) scenario, a *Major* reduction of 9 dB(A) compared with Do Minimum (2029) and 8 dB(A) compared with the Do Minimum (2014).

6.6.45 Properties in the centre of the village such as those along North Street would typically have Do Something (2029) levels that range from 57 to 64 dB(A), the majority of which have *Minor* reductions compared with Do Minimum (2029) and *No Change* compared with Do Minimum (2014). The Primary School is set back from this road up School Lane and has Do Something (2029) noise levels of only 50 dB(A) and would have *No Change* in level compared with Do Minimum conditions in 2029 and a *Minor* reduction in level compared with Do Minimum (2014). In High Street, The Chequers PH, for example, has a Do Something (2029) noise level of 64 dB(A) which is 2 dB(A) lower than Do Minimum (2029), a *Minor* reduction.

6.6.46 The properties along Kilworth Road generally have Do Something (2029) noise levels between 54 and 64 dB(A), with *Minor* 1 - 2 dB(A) increases in noise level compared with Do Minimum (2029) and *Moderate* 3 - 4 dB(A) increases compared with Do Minimum (2014). Stanford Road generally has *No Change* or *Negligible* increases in Do Something (2029) compared with Do Minimum (2029) and *Minor* decreases compared with Do Minimum (2014). Rugby Road would have increased traffic with the proposals in place which would give rise to *Minor* or *Moderate* increases in noise level in Do Something compared with Do Minimum in the design year (2029). Compared with Do Minimum (2014), the increases in level are not as large and in fact, for some properties such as 1, 2, 3 and 4, there will be a *Minor* reduction in noise level. Westfield Lodge is also on Rugby Road but is much closer to the junction than the rest of the village. Here the levels on the north façade of the property would increase from a Do Minimum (2029) level of 67 dB(A) to a Do Something (2029) level of 70 dB(A), a *Moderate* increase. The western façade of Brookside is more exposed to the noise from the M1 itself and here there would be a reduction in level of only 1 dB in 2029, but 3 dB(A) compared with 2014.

Stanford on Avon and Clay Coton

6.6.47 The north façades of properties along the local road through Stanford have noise levels only controlled by this road while properties with south facing façades receive some contribution from the distant A14. The north façade of Home Farm which is close to the road would have a Do Something (2029) level of 59 dB(A), a *Minor* 1 dB(A) reduction compared with the Do Minimum (2029) but *No Change* compared with the Do Minimum (2014). For the properties with south facing frontages to the local road, such as Verny Cottage, there would be a *Minor* 1 dB(A) increase in level between the Do Something (2029) and Do Minimum (2029) scenarios but again, *No Change* compared with the Do Minimum (2014) scenario. The Do Something (2029) noise levels would typically be around 58 dB(A) in this area.

6.6.48 Stanford Mear is an isolated property adjacent to the bridge over the A14. Its noise levels are controlled by this major source. Noise levels on the western façade, fronting the local road, would be 64 dB(A) in the Do Something (2029) scenario, a *Minor* increase compared with the Do Minimum conditions in the same year but a *Negligible* decrease compared with 2014. The southern façade facing the A14 would have a greater noise level of 66 dB(A) with the same patterns of change as the western façade compared with both of the Do Minimum scenarios.

6.6.49 The pattern of exposure for properties in Clay Coton is very similar to that described above for Stanford as the road through this hamlet carries almost the same volume of traffic.

Overall Effects of Traffic Noise

6.6.50 This section provides an objective assessment of all the noise levels and changes described above.

6.6.51 Tables 6.4 and 6.5 give the numbers of properties in the study area that would be exposed to noise levels in 3 dB(A) wide bands for the Preferred Route in 2014 and 2029.

Table 6.4 : Year 2014 Do Something

Numbers of properties within each noise level band, L_{10}(18-hour) dB(A)

Property Type	<47.5	47.5 - 50.4	50.5 - 53.4	53.5 - 56.4	56.5 - 59.4	59.5 - 62.4	62.5 - 65.4	65.5 - 68.4	68.5 - 71.4	71.5 - 74.4	74.5 - 77.4	77.5 - 80.4	80.5 - 83.4	≥83.5
Houses & Flats	5	20	34	83	181	113	67	34	16	5	3			
Businesses & Shops		2	3	2	7	8	3	5	1					
Other Facilities		2	1	3	3	1	1	1						

Table 6.5 : Year 2029 Do Something

Numbers of properties within each noise level band, L_{10}(18-hour) dB(A)

Property Type	<47.5	47.5 - 50.4	50.5 - 53.4	53.5 - 56.4	56.5 - 59.4	59.5 - 62.4	62.5 - 65.4	65.5 - 68.4	68.5 - 71.4	71.5 - 74.4	74.5 - 77.4	77.5 - 80.4	80.5 - 83.4	≥83.5
Houses & Flats	5	19	56	125	156	95	71	19	5	6	4			
Businesses & Shops		3	3	2	6	7	3	4	3					
Other Facilities		2	1	5	1	1	2							

6.6.52 Equivalent tabulations for the Do Minimum (2014) and Do Minimum (2029) scenarios were given above as Tables 6.1 & 6.2 in the section 6.4 on Baseline Conditions.

6.6.53 It can be seen from these tables that the majority of residential properties in this study area have L_{10}(18-hour) noise levels in the range 54 to 65 dB(A). In the Do Minimum (2014) (Table 6.1) there would be 58 properties with noise levels of 65.5 dB(A) or more and 9 of these would be exposed to levels of 71.5 dB(A) or more. At the time when The Noise Insulation Regulations were introduced, the Noise Advisory Council described 70 dB(A) as being "the limit of the acceptable". With the introduction of the Preferred Route in 2014, Table 6.4 shows that the number of dwellings with noise levels of 65.5 dB(A) or more would still be 58 with 8 properties with levels of 71.5 dB(A) or more.

6.6.54 Between 2014 and 2029 there would be growth in traffic on the network that would be expected to increase noise levels by typically 1 or 2 dB(A) but this would be offset by the introduction of a low noise surface on the main roads. Table 6.2 shows that without the proposals in place in 2029 there would be 72 residential properties with noise levels of 65.5 dB(A) or more and only 6 exposed to 71.5 dB(A) or more. With the Preferred Route in place in the design year (Table 6.5) the number of dwellings with levels of 65.5 dB(A) or more would be 34 with 10 properties with levels of 71.5 dB(A) or more. Although the number of dwellings exposed to levels of 71.5 dB(A) or more is four more than for the Do Minimum (2029) scenario, the total number of dwellings with levels of 65.5 dB(A) or more has more than halved.

6.6.55 The guidance given in DMRB [5] requires that detailed noise assessment summary tables are produced for both the Do Minimum and Do Something scenarios under consideration. The noise assessment summary tables show the changes in noise level and noise nuisance level for residential property between Do Minimum (2014) and the Do Something in 2029 and between Do Minimum (2014) and the Do Minimum in 2029.

Table 6.6 : Noise Assessment Summary Table - M1 Junction 19 – Preferred Route - Do Minimum

Project/Option: M1 Junction 19 Improvement - Do Minimum in baseline year 2014 compared with Do Minimum in the future assessment year 2029																
Change in noise/nuisance level		**Number of dwellings (façade level noise band $L_{A10,18h}$ dB for Do Minimum condition in the baseline year)**														
		Total	<47.5	47.5 - 50.4	50.5 - 53.4	53.5 - 56.4	56.5 - 59.4	59.5 - 62.4	62.5 - 65.4	65.5 - 68.4	68.5 - 71.4	71.5 - 74.4	74.5 - 77.4	77.5 - 80.4	80.5 - 83.4	≥83.5
Increase in Noise Level	≥5															
	3 - 4.9	2			1	1										
	1 - 2.9	120			6	21	12	18	45	11	5	2				
$L_{A10,18h}$ dB	0.1 - 0.9	37	1	3	8	9	3	9	4							
No change	0	19	4	10	1	2	1		1							
Decrease in Noise Level	0.1 - 0.9	72			10	7	32	17	5	1						
	1 - 2.9	309			9	47	79	78	57	22	10	4	3			
	3 - 4.9	2			1	1										
$L_{A10,18h}$ dB	≥5															
Increase in Nuisance Level	≥40															
	30<40%															
	20<30%															
	10<20%															
	<10%	137		3	10	23	14	23	46	11	5	2				
No change	0	70	5	10	9	18	17	6	5							
Decrease in Nuisance Level	<10%	354			17	47	96	93	61	23	10	4	3			
	10<20%															
	20<30%															
	30<40%															
	≥40															

Table 6.7 : Noise Assessment Summary Table - M1 Junction 19 – Preferred Route - Do Something

Project/Option: M1 Junction 19 Improvement - Do Minimum in baseline year 2014 compared with Do-Something in the future assessment year 2029																
Change in noise/nuisance level		**Number of dwellings (façade level noise band $L_{A10,18h}$ dB for Do Minimum condition in the baseline year)**														
		Total	<47.5	47.5 - 50.4	50.5 - 53.4	53.5 - 56.4	56.5 - 59.4	59.5 - 62.4	62.5 - 65.4	65.5 - 68.4	68.5 - 71.4	71.5 - 74.4	74.5 - 77.4	77.5 - 80.4	80.5 - 83.4	≥83.5
Increase in Noise Level	≥5															
	3 - 4.9	35			3	18	6	1	1		4	2				
	1 - 2.9	31		5	6	4	4	5	5	1	1					
$L_{A10,18h}$ dB	0.1 - 0.9	38		1	2	3	4	7	18	2			1			
No change	0	29	5	7	3	3	6	1	4							
Decrease in Noise Level	0.1 - 0.9	86			15	17	21	14	18	1						
	1 - 2.9	272			7	39	76	76	41	19	8	4	2			
	3 - 4.9	38				4	10	12	10		2					
$L_{A10,18h}$ dB	≥5	32						6	15	11						
Increase in Nuisance Level	≥40															
	30<40%	6				3	2	1								
	20<30%	87		1	10	25	18	11	17	4			1			
	10<20%	63		4	5	12	21	9	7	1	1	3				
	<10%	12		1	1	1	1	2			4	2				
No change	0	103	5	7	8	8	29	21	21	1		1	2			
Decrease in Nuisance Level	<10%	278			12	39	56	78	66	17	10					
	10<20%	12							1	11						
	20<30%															
	30<40%															
	≥40															

6.6.56 Tables 6.6 and 6.7 are the DMRB [5] noise assessment summary tables for the Preferred Route. It can be seen from Table 6.6 that in the Do Minimum scenario, 159 dwellings can expect to have increased noise levels while 383 would have decreases in level over the 15 year assessment period. These increases and decreases arise from a combination of general growth in traffic flow, changes in traffic routing caused by congestion at key junctions and the benefit of the introduction of a low noise road surface on the main roads. In the Do Something scenario shown in Table 6.7 there would be 104 dwellings with increased noise levels and 428 with decreases. These changes are due to the introduction of the new junction arrangement and the changes in the local road network in addition to the effects described above for the Do Minimum.

6.6.57 In terms of changes in nuisance level, Table 6.6 shows that there would be 137 dwellings with increases in their level of nuisance and 354 dwellings with decreases in the Do Minimum scenario. For the Do Something scenario Table 6.7 shows that there would be 168 properties with increases in nuisance level but these increases would be offset by 290 properties with decreases.

6.6.58 For the assessment of vibration nuisance, the relationship between the percentage of people bothered by largely airborne vibration and the noise levels is similar to that for noise nuisance except that the percentage of people bothered by vibration is lower by 10% at all exposure levels.

6.6.59 The DMRB [5] noise assessment summary tables, such as Tables 6.6 and 6.7, are based on comparisons of the changes in level between a baseline year and either the Do Minimum or Do Something in the design year. As such all the changes include the noise effects of the predicted growth in traffic over the fifteen year period and the changes in the road surface materials. It is possible to examine the direct effects of the proposals without including the effects of traffic growth and change in surface material for the existing roads by comparing the Do Something scenario directly with the Do Minimum either in the year of opening (2014) or in the design year (2029).

6.6.60 A summary of these changes in noise levels at the study area properties is given in Tables 6.8 and 6.9. Table 6.8 compares directly the predicted levels in the year of opening (2014) under the Do Minimum and Do Something scenarios for the residential property while Table 6.9 provides the same comparison for the design year (2029). Each property is classified according to the change in L_{10}(18-hour) noise level on the most exposed façade and these changes in level are shown for each of the bands of noise level for the appropriate Do Minimum scenario.

6.6.61 Table 6.8 provides a summary of the changes in noise level that would occur when the Preferred Route is first opened to traffic. These changes include the effects of the direct impact of the revised junction layout, the benefits of a low noise surface on all the new or altered sections of the main roads and the rerouting of the traffic on the local road network.

Table 6.8 : Year 2014 Do Minimum to 2014 Do Something

Numbers of properties within each noise change band, Baseline Year 2014

Change in noise level		Number of dwellings (façade level noise band $L_{A10,18h}$ dB for Do Minimum in baseline year)														
		Total	**<47.5**	**47.5 - 50.4**	**50.5 - 53.4**	**53.5 - 56.4**	**56.5 - 59.4**	**59.5 - 62.4**	**62.5 - 65.4**	**65.5 - 68.4**	**68.5 - 71.4**	**71.5 - 74.4**	**74.5 - 77.4**	**77.5 - 80.4**	**80.5 - 83.4**	**≥83.5**
Increase	≥5															
Increase	3 - 4.9	6				3	2	1								
Increase	1 - 2.9	77		1	9	24	14	9	17	2			1			
Increase	0.1 - 0.9	73		4	6	13	25	11	7	3	1	3				
No change		71	5	8	1	5	24	17	7	1		1	2			
Decrease	0.1 - 0.9	157			14	21	31	27	31	17	14	2				
Decrease	1 - 2.9	128			6	21	30	45	26							
Decrease	3 - 4.9	16				1	1	4	10							
Decrease	≥5	33						8	14	11						

6.6.62 Table 6.9 provides a direct comparison of the Do Minimum and the Do Something scenarios in the design year 2029. From this table it can be seen that there would be 224 dwellings exposed to an increase in noise level with 308 receiving decreases in their noise levels. This table probably provides the clearest summary of the overall impact of the scheme. These changes arise from the direct impact of the revised junction layout and the rerouting of the traffic on the LRN. The subsidiary effects of the growth in traffic and changes in the road surface materials are effectively excluded from this summary.

Table 6.9 : Year 2029 Do Minimum to 2029 Do Something

Numbers of properties within each noise change band, Design Year 2029

Change in noise level		Number of dwellings (façade level noise band $L_{A10,18h}$ dB for Do Minimum in design year)														
		Total	**<47.5**	**47.5 - 50.4**	**50.5 - 53.4**	**53.5 - 56.4**	**56.5 - 59.4**	**59.5 - 62.4**	**62.5 - 65.4**	**65.5 - 68.4**	**68.5 - 71.4**	**71.5 - 74.4**	**74.5 - 77.4**	**77.5 - 80.4**	**80.5 - 83.4**	**≥83.5**
Increase	≥5															
Increase	3 - 4.9	8			1			2	4	1						
Increase	1 - 2.9	123		7	22	6	43	18	19		4	3	1			
Increase	0.1 - 0.9	93		3	7	32	36	8	4	2	1					
No change		29	4	9	1	3	7	3	2							
Decrease	0.1 - 0.9	168	1		17	45	41	30	18	11	3	1	1			
Decrease	1 - 2.9	84			7	20	19	10	10	16	2					
Decrease	3 - 4.9	12				1	2	5	3	1						
Decrease	≥5	44					1	6	12	22	3					

6.6.63 Overall 28 dwellings would be exposed to noise levels of 68 dB(A) or more in the Do Minimum scenario in the design year 2029 but this would reduce to 16 dwellings in the Do Something (2029) scenario. However, none of these dwellings would be expected to qualify for insulation under The Noise Insulation Regulations 1975 [9].

6.6.64 Appendix C lists all the 64 dwellings that would be subject to *Moderate* and *Major* changes in noise level with the Preferred Route compared with the Do Minimum scenario in the design year 2029. The location of these properties is indicated on Figure 6.2. All these changes are primarily due to the traffic flow changes on the local roads.

6.6.65 The objective assessment set out above has shown that implementation of the proposed M1 Junction 19 Improvement would give rise to both increases and decreases in noise level and nuisance at individual properties. However, there are more decreases in noise level than increases and the magnitudes of the decreases are greater than the increases.

6.6.66 There are very few properties close to the junction. Those that are would continue to be exposed to traffic noise but there would be very little direct change in level for these properties arising from the improvements. Most of the properties that are affected are on road links that form parts of the LRN and these changes in level are the result of redistribution of the local traffic.

6.6.67 DMRB [5] indicates that night-time conditions should also be taken into account in assessments of this type. In this case an improvement of an existing junction is being considered. There are no night-time traffic forecasts for the proposals and it is considered that there is no evidence to suggest that there would be any significant change in the existing variation between night-time and daytime flows. Accordingly no specific assessment of the night-time conditions has been undertaken. However, noise levels during the night-time period are likely to remain between 6 and 10 dB(A) lower than the daytime levels and so the changes in the impact set out above for the 18-hour day would be likely to apply equally to the night-time period.

6.6.68 As stated above, the findings of the noise assessment in terms of relief or worsening of the noise climate as set out above may be considered to be generally applicable to vibration exposure and vibration nuisance levels.

6.6.69 Overall it is considered that in terms of operational noise and vibration there would be a *Moderate Beneficial* change in impact with the introduction of the proposed M1 Junction 19 Improvement.

Implications for Planning Policies

Regional Policy

6.6.70 Policies QE3 and QE6 from the West Midlands Regional Spatial Strategy seek to minimise the impacts of noise and light pollution as a result of development and to promote a reduction in noise pollution and disturbance as a result of development.

6.6.71 The proposed development would accord where possible with these Regional Policy Objectives through the use of mitigation measures such as screening during the construction phase, therefore having a Neutral overall Impact on these policies.

6.6.72 There are no policies from the East Midlands Regional Plan that are relevant to noise or vibration.

Local Policy

6.6.73 There are no policies contained within the North Northamptonshire Core Strategy Issues and Options document that are considered relevant to noise or vibration.

6.6.74 Saved policy EV23 from the Harborough District Local Plan seeks to refuse development that has an adverse effect on the character of its surroundings, including through noise pollution. It is proposed by this policy that mitigation measures should be utilised to minimise the potential for adverse impacts. Core Spatial Policy 3 from the Harborough District Core Strategy (final draft) document seeks to locate development in sustainable locations where possible.

6.6.75 Although there are no saved policies from the Daventry District Local Plan that are relevant to noise or vibration, Strategic Objective 8 of the joint West Northamptonshire Core Strategy Issues and Options document states that development should exhibit locally distinctive, high quality design where possible and sustainable construction which is sensitive to the surrounding environment. The proposed development will include sensitive design features that accord with this objective, resulting in an overall neutral impact.

6.6.76 Saved policy GP3 from the Rugby Borough Local Plan is relevant to Noise and Vibration as it requires development to ensure that there are no adverse impacts on amenity caused by noise and disturbance from traffic. Through the implementation of mitigation measures during the construction phase, this policy will be subject to a neutral impact.

6.6.77 Overall, it is not considered that the proposed improvement to Junction 19 would negatively impact on Regional or Local policy principles and objectives in relation to noise or vibration, providing that mitigation measures are implemented during the construction phase in order to minimise the potential for noise pollution and other associated impacts.

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6.7 SIGNIFICANCE OF EFFECTS

6.7.1 From the objective assessment of the proposals set out above it is possible to prepare a subjective assessment of the significance of the overall impact by comparing the magnitude of the objective assessment with the sensitivity of the receptors affected. The criteria that have been used for this assessment are specified in DMRB [1] and set out in Appendix B.

6.7.2 For the construction period, the magnitude of the overall noise and vibration impact is assessed as *Minor Adverse* and therefore, assuming that all dwellings are regarded as *High* sensitivity, the significance of the noise and vibration effect is considered to be *Slight Adverse*.

6.7.3 The magnitude of the overall noise and vibration impact of the operational use of the M1 Junction 19 Improvement is assessed to be *Moderate Beneficial* and therefore, assuming that all dwellings are regarded as *High* sensitivity, the significance of the noise and vibration effect is considered to be *Moderate Beneficial*.

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6.8 INDICATION OF DIFFICULTIES ENCOUNTERED

6.8.1 No specific difficulties were encountered in the preparation of the noise and vibration assessment set out above.

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6.9 SUMMARY

6.9.1 This chapter has presented the results of the traffic noise and vibration impact assessment of the proposals for the M1 Junction 19 Improvement and has evaluated the noise benefits and disbenefits for both the construction and operational phases.

6.9.2 Introducing an improvement scheme of this nature would inevitably have some impact on the noise environment of the surrounding area. Every effort has been made in the design of the proposals to keep the noise impact to the minimum. There are very few residential properties that are close to proposed alterations. Those that are would continue to be exposed to traffic noise from this important junction but would receive some benefit from the low noise surface material that would be used on the new and altered highway sections. Such benefits would also occur eventually without the junction improvement, as it is policy to provide low noise surface as part of ongoing maintenance works. Most of the properties that are affected are on road links on the local network that are affected by redistribution of the local traffic.

6.9.3 The sections above have presented the results of the noise calculations. The data presentation includes the requirements of DMRB [5]. Tabulations have been prepared to present a quantitative assessment of the impact and a qualitative assessment of the magnitude of the impact for the operational use of the scheme has also been prepared.

6.9.4 In summary, it is clear that the introduction of the proposals for the M1 Junction 19 Improvement would give rise to both increases and decreases in noise levels and nuisance at individual properties. Most of the impact is due to changes in traffic flow on the local roads and the majority of the changes in noise level would be decreases. Taking into account the objective assessments set out above, the overall significance of the noise and vibration impact has been assessed as being *Moderate Beneficial*.

6.9.5 In terms of the objectives set out in paragraphs 6.1.9 to 6.1.11 the assessment has shown that the improvements would on balance reduce noise levels on opening and the objectives have been achieved. This remains the case in the design year 2029 when the introduction of low noise surface is treated as a common factor between the Do Minimum and Do Something.

6.9.6 Mitigation measures have been incorporated into the design in terms of low noise surfacing which is anticipated to result in a reduction of 3.5dB(A) compared with existing conventional hot rolled asphalt surface. Low Noise Surfacing would be applied to all new motorway and trunk road sections of the M1 Junction 19 Improvement, but has not been allowed for on new sections of the Local Road Network. It should be noted that the benefits of using Low Noise Surface would also occur eventually without the junction improvement, as it is HA policy to provide it as part of ongoing maintenance works.

6.9.7 The construction period is more likely to give rise to disturbance than the operational use of the improved highway. The mitigation measures that would be undertaken as part of the contract have been discussed and there would be liaison with the local authority both before and during the construction period.

6.9.8 Overall the significance of the noise and vibration effect during the construction period is considered to be *Slight Adverse*.

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6.10 REFERENCES

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2. M1 Junction 19 Improvement, comparative Environmental Assessment, Chapter 7 Noise and Vibration, Highways Agency, June 2008

3. M1 Junction 19 Improvement, Catthorpe Viaduct Replacement, Environmental Screening (Assessment) November 2009

4. M1 Junction 19 Improvement, Environmental Impact Assessment Scoping Report, Highways Agency, March 2009

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6. Calculation of Road Traffic Noise, Department of Transport and Welsh Office, HMSO, 1988

7. A New Deal for Trunk Roads in England, Department of the Environment, Transport and the Regions, July 1988

8. Land Compensation Act 1973, HMSO

9. The Noise Insulation Regulations 1975, Statutory Instruments 1975 No. 1763, HMSO

10. The Noise Insulation (Amendment) Regulations 1988, Statutory Instruments 1988 No. 2000, HMSO

11. The Environmental Noise (England) Regulations 2006, Statutory Instruments 2006 No. 2238, HMSO

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