Bexhill to Hastings Link Road

Chapter 11: Noise and Vibration

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11.1 Introduction

11.1.1 This chapter assesses the noise and vibration effects of the Scheme with respect to current standards and guidelines. It considers both those areas that may be affected by traffic noise impact and those that may benefit from noise reduction as a result of the construction of the Scheme.

11.1.2 This assessment also considers the effect of construction and the processes that would take place, suggests suitable methods for the control of noise and vibration to acceptable levels and for the provision of mitigation where appropriate.

11.2 Assessment Methodology and Significance Criteria

Overview

11.2.1 An assessment of the impact of noise and vibration requires a comparison of the predicted noise levels resulting from the Scheme in operation with the pre-existing (baseline) levels. The predicted changes may then be judged against known subjective effects as described in Design Manual for Roads and Bridges (DMRB) and quantified with a view to minimising the impact of the Scheme and optimising the design of suitable mitigation measures.

11.2.2 A procedure for the assessment of the impacts and effects of traffic noise from highway schemes was developed in the 1970s and was incorporated into the DMRB Volume 11 Section 3 Part 7.

11.2.3 For the purpose of this assessment, an impact is defined as a change in traffic noise level resulting from the Scheme and an effect is the resulting effect of that change on people and the environment e.g. subjective annoyance.

11.2.4 Noise impacts may depend on:

- Road alignment (vertical and horizontal);
- Sound generation (traffic flow, speed, gradient and road surface type); and,
- Sound propagation (vertical alignment, ground absorption, reflection and scattering).

11.2.5 Traffic and the level of noise it generates fluctuate in intensity hourly, daily and seasonally and so the impact of traffic noise is assessed in terms of a time-averaged indicator.

11.2.6 In the UK, traffic noise is normally assessed using the $L_{A10\ 18h}$ index. This is the noise level exceeded for 10% of the time for each hour of the 18-hour period from 0600 to 2400 hrs on an average weekday. This takes account of the annual average weekday traffic (AAWT) flows, speeds and percentage of heavy vehicles. All traffic noise data in this report follow this convention unless stated otherwise.

11.2.7 The assessment of noise and vibration has been carried out in accordance with the guidance in DMRB. It covers three aspects of noise and vibration:

- Road traffic noise;
- Vibration due to road traffic; and,
- Construction noise and vibration.

11.2.8 Other guidance and standards are referred to as appropriate.

Human Hearing - The Decibel Scale

11.2.9 The human ear is a very sensitive system with an extensive dynamic range. To accommodate this very large range, noise levels are measured using the decibel (dB) scale. The sound pressure in microPascals (μPa) is shown to illustrate the need for the use of the decibel. However, it is a logarithmic and not an arithmetic scale. This complicates the mathematics, but makes the numbers more manageable and, with familiarity, more meaningful.

11.2.10 A sound level meter theoretically has a flat response, in other words it responds exactly the same at different frequencies. Unlike a sound level meter, the human ear responds differently at different frequencies, so a weighting, or filter, can be used so that the meter responds more like the human ear.

11.2.11 The most commonly used weighting is referred to as the ‘A‘ weighting and readings are usually measured in dB(A). Table 11.1 shows some typical noise levels associated with everyday noise sources and may help to give an appreciation of the various levels presented in this assessment.

Table 11.1 Typical Sound Levels in Everyday Situations

Situation/noise source	Sound pressure level in dB(A)	Sound pressure in μPa (10^{-6} Nm^{-2})	Average subjective
Military jet aircraft take off at 30m	140	200,000,000	Painful, intolerable
Pop concert	105	3,500,000	
Night club	100	2,000,000	
Heavy goods vehicle at 7m	90	630,000	Very noisy
Alarm clock at 1m	80	200,000	
Domestic vacuum cleaner at 3m	70	63,000	Noisy
Busy office	60	20,000	
Normal conversation at 1m	55	11,000	
Outdoor Living Area	50	6,300	
Reading room of the British Museum	35	1,100	Quiet
Bedroom in a quiet area with the windows shut	30	630	Very Quiet
Remote country location with no identifiable noise source	20	200	
Threshold of hearing	0	20	Uncanny silence

11.2.12 It is commonly accepted that for the average person a change of 1dB in steady noise is just perceptible under controlled conditions. A change of 3dB is noticeable, 6dB obvious and a change of 10dB corresponds approximately to a halving or doubling of the loudness of a sound.

11.2.13 All frequency weightings have a flat response at 1000Hz, that is no correction is applied since the ear's response can be regarded as equal to that of the sound level meter at that frequency. However, in the 63Hz centre–frequency band, for example, the human ear's response is down by around 26dB, so the 'A' filter takes off 26 dB in that centre–frequency band.

11.2.14 Although at each frequency the weighting is considered independently, the levels can be logarithmically added to give an overall 'A' weighted figure that represents the response of the human ear. Generally sound level meters are capable of carrying out this adjustment automatically and can give both linear and 'A' weighted values in dB.

Addition of Noise Levels

11.2.15 The resultant noise level at a location affected by two or more sources has to be calculated using logarithmic, rather than simple arithmetic addition. Consequently, if one source is significantly louder than another, it

would be dominant to the extent that the second source may not have any noticeable effect on the overall noise level. Calculation of Road Traffic Noise (CRTN) Chart 11 illustrates this in the procedure for combining noise levels.

Noise Levels

11.2.16 The ambient noise level in an area is the total noise level experienced and may be due to a combination of several individual sources such as road traffic, aircraft, industrial and human activities. Such noise levels generally fluctuate with time and may be described by a variety of indices.

11.2.17 The index adopted by the Government for assessing road traffic noise is the dB $L_{A10,18h}$ level, defined as the arithmetic mean of the dB(A) noise levels exceeded for 10% of the time in each of the 18, one-hour periods between 6 a.m. and midnight on a typical weekday. A reasonably good correlation has been shown to exist between this index and residents' dissatisfaction with traffic noise over the range from about 30 dB $L_{A10,18h}$ to in excess of 80 dB $L_{A10,18h}$, which encompasses the range of noise found in this area.

11.2.18 Another level in common use is the equivalent continuous sound pressure level, $L_{Aeq,T}$. The $L_{Aeq,T}$ level is the notional steady sound pressure level that, over a given time period T, contains the same acoustic energy as the actual fluctuating noise level during the same period. It is particularly suitable for describing a noise, which consists of occasional short periods of high noise level between relatively longer periods of lower noise levels. It is used for the assessment of several types of noise such as that from construction and demolition sites, railways and industrial premises and in some residential planning assessments. Noise measurements taken at locations over 25m from traffic show that $L_{Aeq,18\ hr}$ is around 2.5 dB lower than $L_{A10,18hr}$ over the same time period.

11.2.19 The scale usually used to describe background noise levels is the $L_{A90,T}$, which is the level exceeded for 90% of the time. At large distances from traffic where the peaks of noise from individual vehicles become less significant, the different noise indicators tend to converge. To that extent, distant traffic noise may well "fill in the gaps" between local sources and so raise $L_{A90,T}$.

Road Traffic Noise – The DMRB Assessment Method

11.2.20 The DMRB, Volume 11, Section 3, Part 7 covers the methodology to be used for the assessment of noise from road traffic to establish the magnitude and significance of any change due to a highway scheme.

11.2.21 DMRB requires the assessment study to cover the area where traffic flow is likely to increase by 25% or more or reduce by at least 20% on existing roads. These traffic changes produce equivalent changes in noise level of at least 1 decibel (dB).

11.2.22 The guidance requires that traffic noise levels are predicted for various scenarios using CRTN. The assessment procedure compares the

noise levels in the Design Year 2025, both with and without the Scheme with the baseline just before opening of the new road in 2010. This procedure therefore includes the effect of long-term regional traffic growth as well as the Scheme itself.

11.2.23 The resulting impacts at dwellings and other properties are then presented in the form of a set of noise assessment summary tables. The table summarises the numbers of dwellings and other sensitive receptors affected by varying degrees of noise change (increase or decrease): 1 < 3dB, 3 < 5dB, 5 < 10dB, 10 < 15dB and ≥15dB.

11.2.24 Since the subjective effect of a given change in noise is dependent on the pre-existing baseline level, the tables are produced for four different ambient noise level bands as follows: <50dB(A), 50 < 60dB(A), 60 < 70dB(A) and ≥70dB(A). A table covering all bands is also produced.

11.2.25 In addition to the assessments required by DMRB, analyses have also been carried out for the opening year 2010 comparing the traffic noise levels with and without the Scheme in order to assess the immediate, step change in traffic noise levels.

Prediction of Road Traffic Noise - CRTN

11.2.26 DMRB Volume 11 requires the use of the standard methodology for prediction and measurement of traffic noise levels given in CRTN. Traffic noise levels are predicted in terms of the $L_{A10,18hr}$ index in dB. This indicator is the A-weighted sound level that is exceeded for 10% of the sample period and gives an indication of the upper limit of fluctuating noise. The main determinant in calculating the traffic noise level is the AAWT for the 18-hour period from 06:00 to 24:00 hours.

11.2.27 In addition to the traffic flow, the calculation of traffic noise levels takes into account the following factors:

- Traffic composition expressed as the percentage of heavy vehicles (all vehicles greater than 1525 kg);
- Mean traffic speed (km/h);
- Road gradient (percentage);
- Type of road surface and texture (texture depth in mm);
- Distance of the reception point from the road;
- Nature of the ground cover between the road and the building (i.e. acoustically reflective or absorbent ground);
- The shielding effect of intervening obstructions such as buildings and topographical features;
- The shielding effects of any purpose built noise barriers or cuttings forming part of the Scheme design;
- Reflections from barriers, walls or buildings on the opposite side of the road;

- Reflections from the façade of the building at the reception point; and,
- The additive effects of noise from more than one road or section of road.

11.2.28 Calculations are generally carried out to represent noise levels at houses or other buildings where the reception point is taken to be 1.0 metre from the building façade at a given height. For dwellings the noise level is normally calculated at first floor level, taken as 4.0m above ground. A correction of 2.5dB is added into the calculated noise level to take account of reflections from the building façade in this instance.

11.2.29 The assessment for this Scheme has been carried out using a computer based prediction model, the SoundPLAN computer model which follows the procedures given in CRTN. SoundPLAN is noise pollution planning and mapping software used to map and assess roads, railways, airports, industrial or leisure noise, for any size project. The software was developed by Braunstein + Berndt GmbH from 1986.

11.2.30 Modelling involves creating a 3-dimensional digital model based on base mapping, ground contours and the engineering plans for the Scheme. Traffic flows for the various scenarios are input into the model as are the required receptor positions.

11.2.31 The CRTN procedure is valid for receptors between 4m and 300m from the road. Beyond 300m DMRB Volume 11, Section 3, Part 7 Chapter 5 suggests that changes in traffic noise level may be approximated using the method given in Transport and Road Research Laboratory Supplementary Report 425, *Rural Traffic Noise – An Approximation* (TRRL SR425).

11.2.32 However, the TRRL SR425 is aimed at determining changes in noise levels across an area of land rather than at specific receiver locations and states that the CRTN methodology should be used to determine the noise level at a specific location. Therefore, as the assessment method for the Scheme is based on predicted traffic noise levels at specific receivers, even where receptors are greater than 300m from any road, in a given scenario the noise level has been predicted using the method set out in CRTN rather than making use of the less accurate method described in TRRL SR425.

11.2.33 However for sites beyond about 600m the noise changes between contours representing the different scenarios, providing the source in each instance is on the same side of the receiver, would be representative, but predictions of absolute noise levels, due to the varying effects of wind and temperature, are less likely to be accurate.

11.2.34 To determine road traffic noise effects throughout the Scheme corridor, noise contour maps have also been produced using the SoundPLAN computer model.

Assessment of Noise Nuisance

11.2.35 An important factor to be taken into account when planning new roads is to consider whether the resultant noise levels are acceptable in

relation to the existing environment. The results of social survey investigations enable judgements to be made on the average response of people to traffic noise.

11.2.36 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 response 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 or level changes by a number of surveys. These surveys found a correlation between 'steady state' long-term dissatisfaction and traffic noise level dB $L_{A10,18hr}$ index. However, for noise levels below about 55dB the correlation was less clear, with factors other than traffic flow affecting the dissatisfaction rating.

11.2.37 Such surveys have indicated that external traffic noise levels of up to 55dB $L_{A10,18hr}$ are acceptable to a large majority of the population. This is not surprising because such levels of traffic noise would not cause undue disturbance to conversational speech outside the home. Inside, after allowing for the sound insulation of the building façade, noise generated by normal domestic activities could be expected to mask the sounds of traffic. With increasing dB $L_{A10,18hr}$ traffic noise levels, the level of public dissatisfaction increases accordingly, and it has been found that a substantial proportion of the population would be annoyed in their homes by traffic noise when the external level exceeds 70 dB.

11.2.38 In the United Kingdom, the Noise Advisory Council recommended that existing residential development should not be subjected, as an act of conscious policy, to external noise levels in excess of 70 dB $L_{A10,18hr}$ unless some form of remedial or compensatory action is taken. They also stressed that this level constitutes the limit of the acceptable rather than a standard of what is desirable. This is the basis for the 68dB $L_{A10,18hr}$ criterion that is the specified level for sound insulation to be provided in the England and Wales Noise Insulation Regulations (SI No. 1763, HMSO, 1975 as amended 1988), after taking into account a 2dB adjustment of the criterion level for uncertainty in the prescribed calculation methodology.

11.2.39 Methods for the assessment of noise nuisance have been developed based on the types of surveys discussed above. Research has indicated that individuals are more sensitive to abrupt changes in noise but that some habituation occurs over a long period. Assessment methods for nuisance need to take such factors into account and the methodology to be used is set out in DMRB, Volume 11, Section 3, Part 7, Chapter 5.

11.2.40 The methodology quantifies changes in noise nuisance based on estimates of the percentage of people likely to be bothered by predicted traffic noise levels generated by a scheme. Graphs in DMRB show the relationship between changes in noise and the percentage of population bothered, and the relationship between the steady state noise level and the percentage of population bothered. These are used to determine the noise effects of a scheme both in the short and long term.

11.2.41 The assessment method therefore requires that the effect of the immediate change on opening is considered in addition to that in the long-term. The worst-case is used for the assessment, which is generally the short-term abrupt change following the opening of a scheme (See DMRB, Volume 11, Section 3, Part 7, Chapter 5).

11.2.42 The results of the noise nuisance assessment are a set of changes in percentage nuisance for the noise receptors for both the Do-Something and the Do Minimum Scenarios. These results are presented in bands of increases and decreases in percentage nuisance.

Vibration Due to Road Traffic

11.2.43 Vibration due to road traffic may result from two mechanisms: dynamic forces due to wheel/road interaction with surface irregularities (ground-borne vibration) and airborne noise/structure interaction (airborne induced vibration). In general terms vibration effects would only arise if an element of the building is caused to vibrate at a resonant frequency by the source of vibration. The fundamental resonant frequencies of buildings and building elements are generally low; vibration effects typically occur in the range 8 to 100Hz.

11.2.44 It should be noted that there is a widely held misconception by the public that levels of vibration that are just perceptible are damaging to buildings. Much of the public concern about vibration stems from this understandable but misplaced fear. Vibration levels have to be substantially higher than perception levels before even minor damage to decorations and plasterwork would occur. Vibration at a peak particle velocity (ppv) of 0.5 mm/s is perceptible, but even cosmetic damage is unlikely to occur until a ppv of 5 mm/s is exceeded.

Ground-borne Vibration

11.2.45 Low frequency (generally 8 – 20Hz) vibration may be generated by the dynamic interaction of vehicle wheels with irregularities in the road surface and would enter buildings via the foundations. Ground-borne vibration is normally only a potential effect for properties very close to a road and the effects are generally insignificant beyond 40m from the kerb.

11.2.46 It may reasonably be assumed that newly constructed carriageways are unlikely to generate significant levels of such vibration. Similarly, surface irregularities on existing roads can be rectified by maintenance work. Thus, relief of ground-borne vibration is not usually considered as a benefit of a new road scheme (DMRB Volume 11, Section 3, Part 7, Chapter 6). For the reasons given above no assessment of ground-borne vibration for residential dwellings has been carried out for this Scheme.

Airborne Induced Vibration

11.2.47 High levels of low-frequency noise (50 – 100Hz) from nearby traffic exhausts can induce vibration in building elements, which may be perceptible

and can in turn excite building resonances, generating noise at different frequencies (e.g. window rattle). The majority of traffic-induced vibration in dwellings is caused by low frequency airborne noise rather than ground-borne vibration.

11.2.48 A method for assessing airborne induced vibration is given in DMRB Volume 11, Section 3, Part 7, Chapter 6. Research has indicated that the relationship between airborne vibration and nuisance generally follows that for road traffic noise. For a given level of traffic noise the percentage of people bothered by vibration is 10% lower than the corresponding figure for noise nuisance. This enables changes in vibration nuisance to be estimated from the road traffic noise estimates. The DMRB assessment is restricted to properties within 40m of new or altered roads, as beyond this distance airborne-induced vibration is not considered to be a significant effect.

Construction Noise and Vibration

11.2.49 For the assessment of construction noise effects, BS 5228: 1997, *Noise and Vibration Control on Construction and Open Sites Part 1: Code of Practice for Basic Information and Procedures for Noise and Vibration Control* is the accepted guidance used in the UK. This standard provides methods for predicting construction noise. Source noise level data is required either in the form of plant sound power levels or noise levels for a given construction activity. The predictions take account of the distance of the receptor from the source, ground cover and barrier effects from any intervening screening objects. Noise levels are calculated in terms of the A-weighted equivalent continuous sound level, dB $L_{Aeq,T}$ over a given time period (T). The construction noise calculations have been carried out using the Site Noise computer programme prediction software which follows the calculation procedures detailed in BS 5228: 1997.

11.2.50 Procedures are given in BS 5228: Part 4:1992 *Code of practice for noise and vibration control applicable to piling operations* for the calculation of vibration from piling. Two piling methods are covered: hammer-driven and vibratory-driven piling. Equations are given enabling approximate predictions of worst-case values. The unit of vibration used is ppv in mm per second. The ppv is proportional to the square root of the input energy for the piling, divided by the radial distance between source and receptor.

11.2.51 Other empirical methods have also been used for prediction of vibration from highway construction activities, such as in Transport and Road Research Laboratory Report 429. The report gives examples of relationships between ppv and distance for a number of road construction activities. This enables the construction vibration values to be estimated by selecting a given activity that was carried out in an area with similar ground conditions. Estimates of both average and upper-bound peak particle velocity may be made using the relationships presented, which are given in the form of graphs.

11.2.52 Assessment of construction vibration effects has been considered where these may be significant for sensitive receptors.

Legislation Relating to Noise

The Control of Pollution Act 1974

11.2.53 The Control of Pollution Act 1974, in respect of road schemes, applies only to the construction phase where Sections 60 and 61 of the Act confer duties and powers on Local Authorities to control noise from construction operations.

11.2.54 Under Section 60 the Local Authority may serve a notice to control the works by imposing conditions on generated noise levels, methods of working, including plant and machinery to be used, and permissible working hours, and to ensure that the best practicable means of working are used where necessary.

11.2.55 Section 61 of the Act provides for an advance agreement, between the local authority and the person intending to carry out the work, on the matters which may be regulated by Section 60 and sets out procedures for contractors to obtain 'Prior Consent' for construction works within agreed noise limits.

11.2.56 Applications for such consent are made to the local authority and must contain particulars of the works and the method by which they are to be carried out and a description of the steps that would be taken to minimise noise resulting from the works. The local authority has powers to attach conditions to any consent, limit or qualify any consent to allow for changes and limit the duration of any consents.

The Environmental Protection Act 1990

11.2.57 Under Part III of the Environmental Protection Act 1990, as amended by the Noise and Statutory Nuisance Act 1993 local authorities have a duty to investigate complaints about noise from premises (land and buildings) and vehicles, machinery or equipment in the street. It does not apply to road traffic noise.

11.2.58 If a local authority's Environmental Health Officer is satisfied that the problem complained about amounts to a statutory nuisance then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice may require that the noise or nuisance must be stopped altogether or limited to certain times of the day.

The Land Compensation Act 1973

11.2.59 Part I of the Land Compensation Act 1973 includes provision for compensation for loss in property value resulting from physical agents including noise and Part II includes provision for noise mitigation measures at dwellings adjacent to new highways if certain conditions are satisfied.

The Noise Insulation Regulations 1975 as Amended 1988.

11.2.60 Under the circumstances specified in The Noise Insulation Regulations 1975 (as amended 1988) residential properties may qualify for an offer of noise insulation if all four of the following conditions are satisfied:

- The property must be within 300 metres of the nearest point on the carriageway;
- The maximum predicted façade noise level due to road traffic (the 'relevant' noise level) between the opening of the highway to the public and a date 15 years after (the design year) must equal or exceed 68 dB $L_{A10,18hr}$, (the 'specified' level);
- The 'relevant' noise level must be at least 1dB $L_{A10,18hr}$ higher than the pre-construction year road traffic noise level; and,
- Noise from the new or altered road must contribute at least 1dB $L_{A10,18hr}$ to the 'relevant' noise level.

11.2.61 The Highway Authority has a duty under these Regulations to offer insulation for residential properties with respect to a new road, and discretionary powers in relation to altered roads.

11.2.62 Various discretionary powers are also available in relation to façades or parts of façades contiguous with a qualifying façade. The authority also has discretionary power to offer insulation against construction noise. The Regulations apply to habitable rooms and so exclude bathrooms, toilets, halls and kitchens that do not include dining areas.

11.2.63 Some residential buildings are not eligible under the Regulations. These include houses first occupied after the 'relevant date'. This is the date a new or altered road was first opened to public traffic.

Study Area and Years of Assessment

11.2.64 Following the guidance given in DMRB, the study area for noise assessment has been determined to correspond with changes in traffic of at least +25% or -20% over the road network in the opening year as these would correspond to a noise change of at least 1dB. A 1dB difference from an abrupt change is generally accepted as a threshold of significance and equates to the minimum noise change that people can perceive. Such changes may result from differences in:

- Road alignment;
- Sound generation (traffic flow, speed, gradient and road surface type); and,
- Sound propagation (vertical alignment, ground absorption and reflection).

11.2.65 DMRB, CRTN and the NIR define the area of potential effects as within 300m of the new or existing road scheme. Thus, receptors within 300m of roads experiencing +25% or -20% change in traffic flow are included in the study area.

11.2.66 However because part of the Scheme passes through a quiet rural area with low ambient noise levels, consideration has also been given to the propagation of noise over longer distances. Therefore, there are a number of receptors located beyond 300m from the existing and proposed alignments.

11.2.67 The assessment years for road traffic noise and vibration are 2010 (Opening Year), which is also taken as the Baseline and 2025 (Design Year). For construction the assessment covers the construction period, which in this case would be 2008 to 2010.

Representative Receptors

11.2.68 For the road traffic noise and construction noise models, 331 representative receptors, each representing one or more properties, have been defined within the study area (shown on Figures 11.1 to 11.27), taking into account all areas that could be affected by the Scheme. Changes in noise levels have been assessed for residential, commercial and industrial properties and also community facilities.

11.2.69 Two types of noise levels have been estimated: façade, to represent external noise levels at buildings and free-field, to represent external noise levels affecting people visiting the countryside and other public facilities. For receptor locations at buildings, the noise levels have been calculated 1m from the façade of the building. Where a receptor location represents a property with more than one floor, calculations have been undertaken at each floor, at a height of 1.5m above ground for the ground floor, and at height increments of 2.5m for additional floors. For receptor locations representing recreational open spaces, noise levels have been calculated at a height of 1.5m above ground and in 'free-field' conditions.

11.2.70 A list of the receptors used in this study is presented in Appendix 11-B which gives the reference identification number, address and the number of properties represented by each receptor. Receptors are classified residential, commercial, community and industrial. The same receptor locations have been adopted for both the construction noise and the road traffic noise assessment.

11.2.71 Vibration effects have been assessed for selected receptors that could experience potentially significant effects from operational or construction vibration.

Significance Criteria - Road Traffic Noise

11.2.72 Subjective reaction to changes in noise varies widely with the individual and factors such as tonal and temporal character of the noise and time of day. The noise change bands given in DMRB (Volume 11, Section 3, Part 7, Chapter 8) broadly reflect subjective reaction.

11.2.73 The significance of any noise effects depends on several factors, including the number of adverse or positive impacts, absolute noise levels, temporal change and sensitivity of receivers as well as the magnitude of noise

change or impact at individual receptors. For the purpose of this study noise change criteria are described as follows:

- A change of 1dB is generally considered to be noticeable only when a subject is deliberately listening for a change. Such a change would result from a 25% increase or 20% decrease in traffic flow (assuming no change in speed);
- A change of 3dB would be readily perceptible in the short-term and would result from a doubling or halving of the traffic flow. In the long-term, changes of less than 3dB are generally considered to be Minimal;
- A change of 3 to 5dB would be clearly perceptible in the short and long-term and is described as Slight;
- A change of 5 to 10dB is described as Moderate;
- A change of 10dB would be perceived as a doubling or halving in noise level and changes of 10 to 15dB are described as Substantial; and,
- Changes in excess of 15dB are described as Major.

11.2.74 For local roads in complex, urban areas where many receptors receive traffic noise from a number of surrounding road sources as well as from multiple non-traffic sources such as railways or industrial premises, it is not reasonable to predict baseline noise levels from predicted traffic flows on major links alone. The result would be an assessment based on under predicted baseline noise levels and would therefore be likely to over predict the effects of traffic noise and traffic noise changes. In these situations even where there may be traffic flow changes of the order of 25% increase or 20% decrease, the noise level changes at noise sensitive properties are likely to be less than 1dB(A). Accordingly, minor roads in complex urban situations have been excluded from this assessment.

11.2.75 On roads where the traffic flow is less than 1000 vehicles per day, predictions by the method described in CRTN are unreliable. Traffic noise is unlikely to be the dominant noise source and therefore these road links are not included in the assessment.

11.2.76 The Table 11.2 summarises the description of noise change criteria for road traffic noise impacts.

Table 11.2 Description of Road Traffic Noise Impacts

Change in noise level (dB)	Descriptor
1 to <3	Minimal
3 to <5	Slight – Increase or Decrease
5 to <10	Moderate– Increase or Decrease
10 to <15	Substantial– Increase or Decrease
15 or over	Major– Increase or Decrease

Operational Vibration Criteria

11.2.77 Airborne-induced vibration is assessed by considering the change in nuisance according to DMRB. The results are presented in the form of a table showing the numbers of properties affected in percentage nuisance categories.

11.2.78 For the reasons given in the Ground-bourne section above, no assessment of ground-borne vibration due to road traffic is presented in this assessment for dwellings.

Construction Noise and Vibration Criteria

11.2.79 There are no recently published guidelines giving construction noise limits for the UK. However, limits were first suggested by the Wilson Committee (1963) that proposed daytime limits in terms of levels outside the windows of the nearest occupied buildings of:

- 70 dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise; and,
- 75 dB(A) in urban areas near main roads and heavy industrial areas.

11.2.80 This guidance is also reproduced in the Government's current guidance on construction noise control, Advisory Leaflet 72, *Noise Control on Building Sites* (Department of the Environment, 1978). The Advisory Leaflet also indicates that for the evening period (19.00 - 22.00 hours) a limit of 10dB below the daytime level may be appropriate.

11.2.81 For night-time construction noise there are no guideline limits.

11.2.82 Having regard to this guidance it is considered that the 75dB $L_{Aeq,12\ hr}$ daytime limit should apply to properties near the existing road alignment and the 70 dB $L_{Aeq,12\ hr}$ daytime limit should apply to isolated properties or properties not currently exposed to significant levels of traffic noise. The limits given in the Table 11.3 have been adopted.

Table 11.3 Construction Noise Criteria – Residential

Time of Day	Construction Noise Level	
	Within 150m of existing road	**Over 150m from existing road**
Daytime (07:00-19:00 hrs)	75 dB $L_{Aeq,12\ hr}$	70 dB $L_{Aeq,12\ hr}$
Evening (19:00-22:00 hrs)	65 dB $L_{Aeq,1\ hr}$	60 dB $L_{Aeq,1\ hr}$
Night-time (22:00 – 07:00 hrs)	Either 55 dB $L_{Aeq,\ 1\ hr}$ or Ambient $L_{Aeq,\ 9hr}$ + 5 dB: The lower level applies	

11.2.83 The significance of daytime and evening construction noise effects has been assessed by comparing predicted construction noise levels during the construction phase against these limits, also taking into account the duration of any exceedence. The criterion for a significant construction noise effect has been taken to be where the limits given in Table 11.3 are likely to be exceeded over a period of at least one month. The predicted construction noise level must also exceed the ambient level by 5dB for there to be a significant construction noise effect.

11.2.84 For night-time construction noise, effects would be considered as significant where the predicted ambient noise level during construction exceeds either 55dB $L_{Aeq,1hr}$ or the night-time ambient noise level prior to construction by at least 5dB whichever is the lower limit. The criterion for a significant construction noise effect has been taken to be where this level is likely to occur over a period of at least one month. This criterion is also given in Table 11.3.

11.2.85 The construction noise guidelines discussed above relate principally to dwellings and other noise-sensitive buildings. There is no specific guidance relating to outdoor amenity areas or other outdoor facilities. For these locations the difference between the total ambient noise level during construction and the ambient noise level prior to construction would be indicative of the noise impact and the criteria given in Table 11.3 above have been applied to these differences. Effects are considered where the difference is expected to be at least 5dB for a period of one month or more. However, it should be noted that most users of outdoor facilities would be likely to be making short-term visits. Therefore, actual perceived impacts for users may be less than indicated by the assessment.

11.2.86 For ground-borne construction vibration, thresholds for the onset of cosmetic damage to residential buildings from piling vibration, in terms of ppv, are given in BS 5228: Part 4. The thresholds are 10mm/s for intermittent vibration and 5mm/s for continuous vibration. Below these thresholds, vibration is not considered to be significant. Estimated vibration values within buildings may also be compared with criteria relating to human response given in BS 6472:1992. Table 11.4 below is reproduced from this standard.

Table 11.4 Vibration Dose Values ($ms^{-1.75}$) Above Which Various Degrees of Adverse Comment May be Expected in Residential Buildings

Place	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential building - 16h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building - 8h night	0.13	0.26	0.51

Surveys Undertaken

11.2.87 In order to provide a basis for future comparison and to assist in the calibration of the computer prediction model, noise level measurements have been taken at representative locations adjacent to the Scheme alignment. These measurements, however, inevitably include noise from non-traffic sources (including domestic activity, farming activity, birds and wind-related effects, etc.) and would not be exactly the same as predicted traffic noise levels at the same locations.

Consultations

11.2.88 The Rother District Council (RDC) and Hastings Borough Council (HBC) Environmental Health Officers (EHO) have been consulted in relation to the construction noise assessment methodology and agreement sought for the general approach to the assessment and the assessment criteria for daytime, evening and night-time construction noise.

11.3 Baseline Conditions

Overview

11.3.1 In accordance with DMRB 11:3:7, the baseline for noise has been defined as the situation expected to exist just before the Scheme opens. This is in the absence of any noise from construction operations and is currently assumed to be in 2010.

11.3.2 Details of traffic flows for the Do-Minimum scenario opening year 2010 and design year 2025 are given in Chapter 6: Travel and Transport. These only include flows above 1000 vehicles per 18 hour AAWT.

11.3.3 Traffic noise is the main feature of the local noise climate for many locations in the area around the Scheme. There are no significant industrial noise sources in the area. Some locations are remote and do not currently receive any significant traffic noise.

11.3.4 In this study, and in accordance with paragraph 14.4 of CRTN, the average speeds have been taken for each link from the traffic data provided for each scenario. The default speed values in paragraph 14.2 of CRTN have not been used because this would tend to overestimate levels in the existing and Do-Minimum scenario.

11.3.5 The topography in the area is complex and this significantly affects noise propagation. Buildings and other structures can effectively screen some locations. Thus, a house affected by noise on one side may provide effective screening to windows or other buildings on the side away from the road. Local structures may cause levels to be lower than indicated in the calculations.

11.3.6 The description of 2010 baseline levels, which forms the basis of the assessment of noise change in the operational noise assessment section, is based on calculated noise levels using predicted Do-Minimum 2010 traffic flows.

11.3.7 Predicted road traffic noise levels for the receptors are shown on Figures 11.1 to 11.27. The baseline and predicted future conditions with regard to road traffic noise are described by section of the route, from south to north. A noise contour plan showing 2010 Do-Minimum (baseline) levels for the Scheme is given on Figure 11.30.

11.3.8 In order to provide a basis for future comparison, the 18-hour noise levels have been measured at representative locations. These measurements unavoidably include noise from non-traffic sources (including distant aircraft, farming activity, birds and wind-related effects etc.) and may not necessarily be the same as predicted noise levels at the same locations.

11.3.9 They therefore may not represent the annual average conditions but complement the calculations, particularly in quieter areas and at distances beyond the strict validity of the CRTN procedure.

11.3.10 The full details of the surveys are given in separate documents and a summary of the general findings is given in Table 11.5. The baseline noise surveys are discussed below and the survey reports are in Volume 2.

Baseline Surveys – Existing Situation

11.3.11 As part of the assessment of noise impact from the Scheme, a survey of existing noise levels has been carried out. Measurements were carried out between February and March 2006 at 49 representative locations, most of which were situated near houses.

11.3.12 Short term measurements were repeated at 24 of the original locations between May and June 2006.

11.3.13 The purposes of the surveys are:

- To provide information on existing noise levels in areas which may be affected by construction noise;
- To form the basis of a comparison of measured noise levels in the areas around the Scheme with the noise levels predicted by calculation for the Do-Minimum 2010 situation; and,
- To provide information on existing noise levels in areas where traffic is not currently the most important source of noise or where traffic noise is virtually absent.

11.3.14 The purpose of the second set of measurements is to examine the noise conditions during the summer months and to examine any difference that may occur between the seasons.

Procedure

11.3.15 Short term attended and long term continuous noise measurements were obtained at locations shown in Figures A1 to A13 in Appendix 11-G.

11.3.16 The measurements followed a modification of the shortened measurement procedure given in CRTN.

11.3.17 The shortened measurement procedure allows the $L_{A10,18hr}$ level to be determined by measuring the $L_{A10,1hr}$ level over three consecutive hours between 10:00 and 17:00 hours on a single weekday. In practice a satisfactory measurement of $L_{A10,1hr}$ can be obtained by measuring for a fifteen minute period in each of 3 consecutive hours, given sufficient traffic flow. The modified method involved 15-minute samples at each of a number of locations on one day. Where possible, these measurements were repeated on several occasions in order to cover a range of wind conditions and seasonal variations. Where appropriate the $L_{A10,18hr}$ value was obtained by taking the arithmetic average of the $L_{A10,15\ min}$ values and subtracting 1dB in accordance with CRTN.

11.3.18 Except where otherwise stated all measurements were taken at a microphone height of 1.5 m. Where the measurement was a façade measurement the microphone was 1m from the façade.

Discussion of Results

11.3.19 Short term attended surveys were all undertaken during good weather and therefore the results were not affected by adverse weather, precipitation or excessive wind speeds.

11.3.20 Weather data have been obtained for the periods covering the long term unattended sites. The data acquired showed that the mean daily wind speeds were consistently below 6 metres per second throughout all measurement periods and an analysis of the data showed some correlation between wind speed and noise level, even in the rural area where other natural sources were dominant. However as the variation with wind speed was small and there was some scatter in the data it was decided that no noise data would be excluded from the assessment.

11.3.21 The results of the comparison of winter and summer monitoring are given in Appendix 11-D. An assessment of the results of the seasonal monitoring shows that the variation between the seasons is not significant being less than 4dB. Exceptions were at ST17 and ST27 where noise level difference was up to 7dB higher in the winter. No cause was identified in either case.

11.3.22 Table 11.5 is a summary of the noise level data derived from the baseline survey results. The full results are provided in Appendix 11-G.

Table 11.5 Summary of Noise Survey Data

Site No.	Address	dB $L_{A10,18hr}$	dB $L_{Aeq,T}$	dB $L_{A90,T}$	dB $L_{A10,18hr}$	dB $L_{Aeq,T}$	dB $L_{A90,T}$
		February – April			May – July 2006		
ST1	King Offa Way (A259)	77	74	62	76	73	62
ST2	73 Amherst Road	71	69	60	70	68	56
ST3	Hunting Close	59	59	47	58	58	46
ST4	26 Barrack Road	65	63	51	65	63	53
ST5	Edinburgh Road	63	61	49	62	59	50
ST6	128 London Road	74	71	57	72	70	55
ST7	43 Newland Avenue	51	54	44	n/a	n/a	n/a
ST8	46 Bancroft Road	50	49	45	48	48	43
ST9	Bending Crescent	56	55	50	n/a	n/a	n/a
ST10	Woodsgate park	66	64	49	65	63	49
ST11	47 Springfield	55	58	41	n/a	n/a	n/a
ST12	195 London Road	76	75	57	75	72	53
ST13	48 Cambridge	57	58	46	n/a	n/a	n/a
ST14	245 London Road	75	71	55	72	69	52
ST15	Sedgewick Road	57	58	48	n/a	n/a	n/a
ST16	91 Buxton Drive	63	61	44	59	59	41
ST17	8 Birch View	58	57	50	51	51	43
ST18	6 Bodle Crescent	50	53	42	n/a	n/a	n/a
ST19	49 St James	47	47	41	45	44	39
ST20	19 Stevens Close	51	51	42	n/a	n/a	n/a
ST21	21 Meadow	53	54	39	50	50	37
ST22	Glovers Lane	48	47	37	50	49	36
ST23	Glovers Lane	40	40	34	n/a	n/a	n/a
ST24	22 Crowhurst Lane	48	51	38	n/a	n/a	n/a
ST25	Buckholt Cattery	43	44	31	48	50	39
ST26	Buckholt Farm	41	43	31	45	44	37
ST27	Crouchers Farm	64	63	38	57	59	34
ST28	Lower Wilting Farm	65	66	43	63	63	36
ST29	Upper Wilting Farm	62	62	41	n/a	n/a	n/a
ST30	Hollyhocks Cottage	61	62	41	n/a	n/a	n/a
ST31	Mayfield Lane St	54	51	41	51	49	41
ST32	Catsfield Close St	60	57	44	n/a	n/a	n/a
ST33	Woodland Way	48	46	37	n/a	n/a	n/a
ST34	Recreational	52	50	42	55	54	40
ST35	School Crowhurst	57	57	41	57	57	36
ST36	Forewood Rise	54	53	36	53	51	34
ST37	Forewood Lane	58	56	36	n/a	n/a	n/a
ST38	Firewood Lane	56	56	35	57	57	36
ST39	Telham Lane	60	59	35	n/a	n/a	n/a
LT1	110 London Road	56	55	48	n/a	n/a	n/a
LT2	179 London Road	53	53	36	n/a	n/a	n/a
LT3	3 Highfield Gardens	53	52	46	n/a	n/a	n/a
LT4	35 St. James	57	56	47	n/a	n/a	n/a
LT5	Hillcroft Farm	47	49	39	n/a	n/a	n/a
LT6	Adams Farm	45	45	35	n/a	n/a	n/a
LT7	8 Watermill Drive	46	46	31	n/a	n/a	n/a
LT8	Post Office	49	49	41	n/a	n/a	n/a
SML1	281 London Road	52	52	43	50	49	38
SML2	Acton's Farm	45	45	34	45	46	35

Notes:

ST = short term, LT = long term and SML = seasonal monitoring location. n/a indicates sites where further monitoring in the summer period was assessed to be not required.

11.4 Mitigation Strategy

Mitigation Scenarios

11.4.1 Mitigation has been assessed for the Scheme broadly in two distinct phases:

- Where the Scheme passes through the existing built-up area and is confined to the abandoned railway cutting; and,
- Where the Scheme passes through open countryside.

Mitigation Options

Noise Barriers

11.4.2 In the first part of the Scheme, the Bexhill Connection, the potential for the use of bunding and natural screening materials is likely to be limited due to the confined nature of the alignment. In these circumstances it is proposed to provide noise barriers in the form of close boarded fencing 1.8m in height in appropriate positions to achieve the maximum possible benefit having regard to other criteria such as visual intrusion and access arrangements.

11.4.3 Extensive consultations with the Landscape Team and the investigation of a number of alternative barrier configurations have been carried out for the Scheme. This has resulted, particularly in the rural areas, in a design of a combination of bunding and noise fencing which has evolved as an optimum noise barrier configuration.

11.4.4 The design of noise barriers was progressed to reduce traffic noise as far as reasonably practicable on the SSSI, the proposed Greenway and other public rights of way. A criterion of 50 dB $L_{A10,18hr}$ was used as a design aim for these areas. This is based on the advice in *WHO Guidelines for Community Noise* which suggests that few people are moderately annoyed in outdoor living areas at noise levels below 50 dB $L_{Aeq,16\ hrs}$.

11.4.5 The alignments of the proposed barriers are illustrated on Figures 11.28 to 11.29.

Road Surface Type

11.4.6 Paragraph 6.3 of The Roads Review 1998 announced that quieter road surfaces would be routinely specified in all future new and improvement contracts. In the Scheme Thin Surface Course would be specified but the noise reducing benefits of the use of this surfacing material would not be quantifiable as its noise reducing characteristics have not been determined for traffic speeds below 75 kph. However, at a commentary level it may be stated that some improvement over the use of hot rolled asphalt may be expected.

11.4.7 Porous asphalt surfacing referred to as pervious macadam in CRTN, which has quantifiable noise reducing benefits at all traffic speeds, has been considered for the Scheme. Other considerations have however precluded its use in the Scheme design as we are informed by the Engineers that it is prone to deterioration in effectiveness with time as the open texture, which provides the noise reducing characteristics of the material, becomes blinded by debris.
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Noise Insulation

11.4.8 The provisions of the Noise Insulation Regulations would be implemented where appropriate. Although no firm offers of insulation work can be made until the Scheme design is finalised after the completion of the Planning process, and qualifying properties can then be identified.

Construction Noise- Potential Mitigation

11.4.9 A number of adverse construction noise impacts have been identified as part of this assessment. These impacts could be reduced with the adoption of the measures outlined below.

11.4.10 Conventional options for the control and mitigation of construction noise impacts include: careful selection of plant; effective site management; engineering control; acoustic screening; restricted hours of working; and, liaison with the local community. Options for engineering noise control include the adoption of appropriate construction processes and techniques, and these would be considered in further detail prior to the start of construction.

11.4.11 Compliance by any contractor with the general recommendations of BS 5228: Parts 1 and 2 is also considered to represent good practice and would be adopted wherever practicable. These include:

- Vehicles and equipment fitted with effective exhaust silencers, maintained in good working order and operated to minimise noise emissions in accordance with BS 5228;
- Compressors fitted with properly lined and sealed acoustic enclosures where environmental noise disturbance may arise and these should be kept closed whenever the machines are in use;
- Pneumatic percussive tools fitted with mufflers or silencers in accordance with the manufacturer's recommendations;
- Machines in intermittent use shut down in the intervening periods between work or throttled down to a minimum (including HGVs waiting to access the site on the highway);
- Where practicable, rotary drills and bursters actuated by hydraulic or electrical power should be used for excavating hard material;
- Care taken when loading/unloading vehicles, dismantling scaffolding or moving materials to reduce impact noise;
- Noise reduction by the use of temporary barriers, screens, acoustic sheds and enclosures provided where reasonably practicable and when located

close to residential dwellings in accordance with the principles of BS 5228;

- Where practical, all plant to conform to the noise limits presented in the EC Noise Emission in the Environment by Equipment for use Outdoors, Directive 2000/14/EC;
- Noise monitoring undertaken by the Contractor to ensure compliance with any Local Authority construction noise conditions or undertakings made the by the Contractor itself;
- Where practicable the prefabrication of large units undertaken off-site;
- Where practicable and subject to ground conditions, piling techniques that minimise noise and vibration adopted instead of percussive techniques; and,
- The contractor to employ 'Best Practicable Means' (CoPA 1974), at all times and at all locations during the construction phase to minimise construction noise and vibration.

11.4.12 The outline Construction Environmental Management Plan (CEMP) would incorporate a construction code of practice and makes provision for guidance on the control and management of construction environmental impacts. The principles of good practice summarised above and the use of all other reasonably practicable means for the control of noise and vibration would be incorporated into the CEMP.

11.5 Construction Noise and Vibration

General Mitigation Measures

11.5.1 There would be a number of general measures for mitigating construction noise that would be followed by the Contractor in accordance with the CEMP, as discussed in Chapter 3B: Construction Strategy.

Construction Noise

Assumptions

11.5.2 The principal sources of potential construction noise impact are:

- Site clearance;
- Earthworks including cut, fill and drainage operations;
- Asphalt surfacing;
- Construction of structures;
- Patching plant activity; and,
- HGV movements on haul routes.

11.5.3 The plant assumed for the different elements of the programme is based on the outline construction strategy for the works. Further details of the

assumed construction scenario are presented in Chapter 3B: Construction Strategy.

11.5.4 The estimated duration of all site clearance, earthworks and construction work is approximately 2 years with the outline programme presented in Table 11-E.1 of Appendix 11-E.

11.5.5 All construction activities, with the exception of earthworks, have been defined at the centre of specified working areas to provide average working distances between each receiver and the likely construction activity locations, allowing for the typically variable nature of some activities. Earthworks activities have been defined at the limit of the earthworks areas to represent a worst-case assessment. Potential screening from earthworks activities or other operations within earthwork cuttings has not been included to further establish a worst-case assessment.

11.5.6 Worst-case activity $L_{Aeq,T}$ noise levels have been estimated using the guidance provided in BS 5228: 1997: Part 1 and the *Update Of Noise Database For Prediction Of Noise On Construction And Open Sites*; DEFRA (2005).

11.5.7 The assumed plant list and sound power levels are presented in Table 11-F.1 of Appendix 11-F, together with assumed construction activities and percentage on-times.

11.5.8 At this stage of the Scheme development, the information provided in BS 5228 and the DEFRA document constitute the best available information for the purpose of this assessment. It is envisaged that following the development of a more detailed construction programme by the contractor and the availability of equipment and plant manufacturers noise data, overall predicted noise levels at receptors would be lower than presented in this study.

11.5.9 The resultant noise level in each programme period for each receptor has been calculated using the NoiseMap 2000 computer program which adopts the calculation procedures detailed in BS 5228: 1997. Where appropriate the screening effects of buildings and other features have been included in the prediction model. According to BS5228, if partial line of sight exists between a receptor and source a 5dB correction is made to the calculated noise level and if no line of sight exists a 10dB correction can be applied.

Calculated Construction Noise Levels

11.5.10 Calculated noise levels for the construction activity scenarios outlined above are presented in Figure 11.37 in terms of worst-case daytime noise levels for each week over the construction programme from summer 2008. In summary, the presented noise levels are obtained from an estimated activity on-time for each item of assumed plant over a single working day and the aggregated plant noise levels for any given week, activity scenario and source location.

11.5.11 The results of the predictions are given for two categories: for residential and non-residential properties by daytime.

Residential Construction Noise Effects – Daytime (07:00 – 19:00 hrs)

11.5.12 The full list of calculated worst-case construction noise levels is presented in Appendix 11-H. The figure lists the highest predicted construction noise levels for each receptor and identifies those where daytime monthly worst-case construction noise levels, in accordance with the criteria detailed in Table 11.3, are above 75 dB $L_{Aeq,\ 12hr}$ for properties within 150m of the existing roads or 70 dB $L_{Aeq,12hr}$ for properties beyond 150m from the existing roads. The table also indicates the number of months when noise levels are likely to exceed these significance criteria at a receptor.

11.5.13 Table 11.6 below reproduces the entries for the receptors where the construction noise levels are predicted to exceed the criteria detailed above for at least 4 weeks during the construction programme.

Table 11.6 Residential Construction Noise Assessment – Daytime

Rec ID	Address	No. of Residential Properties	Maximum Daily Construction Noise Level, dB $L_{Aeq,T}$	No. of Weeks Criteria Exceeded	Measured Baseline Level, dB $L_{Aeq,T}$
14	112 London Road	10	81	8	71
22	130 London Road	7	77	12	71
28	173 London Road (rear)	17	79	38	52
32	51 Bancroft Road	13	76	7	49
82	Little Actons	1	70	6	45
87	Adams Farm (south)	1	78	11	46
88	Adams Farm (east)	1	76	5	46

11.5.14 The prediction modelling indicates that 49 properties may receive construction noise levels above the adopted criteria for an aggregate period exceeding 1 month during the course of the construction programme.

11.5.15 Many of the properties affected are overlooking the existing railway cutting at their rear and currently front onto London Road. The worst affected is 173 London Road and the 16 other properties that this receptor is designated to represent. These properties would receive construction noise exceeding the criteria for an aggregate of 9½ months of the construction programme

Residential Construction Noise Effects – Evening (19:00 - 07:00 hrs)

11.5.16 The construction programme does not include any planned evening working and therefore no predictions have been made of evening construction noise.

11.5.17 If however, a need to carry out construction activities during the evening on some occasions arises during the construction of the Scheme, mitigation in the form of appropriate screening, suitable plant and activity schedules and temporary relocation of affected residents would be considered as required.

11.5.18 The Ninfield Road Bridge suggested sequence of works allows for full closures to cater for major traffic management switches and the installation and removal of the Bailey bridges. These off-peak closures would be carried out during weekend closures from Friday evenings through to Monday mornings.

Night-time Residential Construction Noise Effects – (22:00 – 07:00 hrs)

11.5.19 No routine night works are planned on the Scheme. The exceptions would be for rail possessions at the rail bridge and at Ninfield Road, where weekend closures may be required for the installation of temporary works. Tie in work at Belle Hill and Queensway may also be carried out off-peak, which may be at night.

11.5.20 The nature and extent of any night-time works on road tie-ins and the rail crossing would be agreed with the appropriate EHO of the local authority.

11.5.21 No separate assessment of night-time working construction noise has been undertaken as no agreement has yet been reached.

Community Facilities Construction Noise Effects – Daytime (07:00 – 19:00 hrs)

11.5.22 No community facilities are predicted to receive construction noise levels in excess of the criteria adopted.

Commercial Receptors Construction Noise Effects – Daytime (07:00 – 19:00 hrs)

11.5.23 Table 11.7 below reproduces the entry for the commercial receptor where the construction noise levels are predicted to exceed the criteria detailed above for at least 4 weeks during the construction programme

Table 11.7 Commercial Construction Noise Assessment – Daytime

Rec ID	Address	No. of Commercial Properties	Maximum Weekly Construction Noise Level, dB $L_{Aeq,T}$	No. of Weeks Criteria Exceeded	Measured Baseline Level, dB $L_{Aeq,T}$
104	Chinese restaurant at junction of London Rd and A259	1	84	22	71

11.5.24 Construction noise levels at this receiver, which is on the corner at the junction of the Scheme with London Road and the A259, are expected to exceed the criteria by up to 9dB(A) for up to an aggregate of 22 weeks during the construction programme and up to a maximum of 5 consecutive weeks at any one period.

Industrial Receptors Construction Noise Effects – Daytime (07:00 – 19:00 hrs)

11.5.25 No industrial premises are predicted to receive construction noise levels in excess of the criteria adopted.

Construction Vibration Effects

11.5.26 No percussive piling or other potentially significant sources of construction vibration are planned for the construction of the Scheme and therefore no significant vibration effects are expected.

Discussion of Construction Noise Effects

11.5.27 Although daytime construction noise impacts have been identified for 49 residential and one non-residential receptor, it is considered unlikely in practice that these impacts would give rise to significant effects. The assumed construction method at this stage of the assessment is a worst-case scenario with the assumption that concurrent activities would occur over a particular month in the same location. In reality the predicted weekly noise levels are likely to represent a worst case scenario.

11.5.28 The prediction methodology adopted for this study is also recognised to over predict construction noise levels, particularly when the noise source term data from BS 5228 are adopted. Furthermore, the latest EC Directive relating to noise emissions from outdoor equipment, which includes construction and demolition plant and equipment, has imposed more stringent noise emission limits on such plant. In the unlikely event of noise levels exceeding those predicted, a scheme for the provision of sound insulation would be put in place. This would provide a final safeguard against excessive construction noise levels and the exceedence of specified limits.

11.5.29 No significant evening construction effects for residential properties have been identified.

11.5.30 No significant night-time noise effects have been identified for residential property in this assessment.

Discussion of Construction Vibration Effects

11.5.31 Construction Vibration at a level which is likely to be of concern to residents is most often the result of percussive piling operations. The bored piling method for those structures on the Scheme which require piled foundations has been chosen to eliminate the possibility of significant vibration effects

11.6 Operational Impacts

General

Road Surface

11.6.1 The general effects of noise from the Scheme are set out in the form of noise contour maps in Figures 11.30 to 11.33 and as described below. These are based upon traffic forecasts for 2010 Do-Minimum and 2025 Do Something and illustrate the predicted traffic noise levels in 2010 without and 2025 with the Scheme. The noise levels have been derived by calculation and give a general indication of the effects of the Scheme.

11.6.2 Figure 11.32 shows noise contours for the 2010 Do-Minimum versus 2010 Do-Something scenario to illustrate the immediate impact of the Scheme, taking account of the proposed mitigation measures. Figure 11.33 shows differences in noise 2025 Do-Minimum versus 2025 Do-Something.

11.6.3 Both the noise contour and differences maps relate to the free-field situations as previously described. It should also be noted that the resolution of the sampling grid used in the calculations and the interpolation process used may not accurately show localised changes.

11.6.4 The significance of the impacts expected from the Scheme has been described for each of the local areas. Within these descriptions, Tables 11.8 to 11.29 summarise the changes in noise expected between 2010 Do-Minimum and the Do-Something 2025 scenario.

11.6.5 The calculations also include the benefits in terms of noise reduction provided by the proposed mitigation in the form of a 1.8 metre high noise fence that is proposed for the alignments as shown on Figures 11. 28 and 11.29. All proposed landscaping where this may provide attenuation has also been taken into account. These reductions have been incorporated into the Scheme noise levels shown in the tables.

Noise Insulation

11.6.6 Assuming the mitigation measures described above are fully implemented, and subject to site inspections, it is expected that only 18

dwellings are likely to qualify for noise insulation. This assessment would be reconsidered and the qualifying properties identified when planning consent has been obtained and the detailed design completed.

Operational Noise Impacts

11.6.7 The baseline traffic noise levels have been determined in accordance with the methodology previously described. To illustrate this situation within the study area, noise contours of baseline conditions taken as 2010 Do-Minimum are presented in Figure 11.30. Figure 10.31 sets out the noise contours for the Do-Something situation in 2025. Both of these have been derived by calculation and give a general indication of the effects of traffic noise. It clearly illustrates that noise can vary widely within a short distance of roads, depending on the effects of screening and reflection by local features and other factors.

11.6.8 By comparing the noise contours in Figures 11.30 and 11.31 to the results of measurements it can be seen that the effects of non-traffic noise sources can increase levels above those calculated for traffic noise in the quieter areas.

11.6.9 For the purposes of the DMRB summary tables, all comparisons take a 'worst case scenario'. This means that where there has been shown to be an increase in noise on one side of a property but a decrease on the other, the increase is taken as representative.

11.6.10 To help illustrate the general effects, a summary of the calculated noise levels at representative locations is given in Tables 10.8 to 10.29 for the various locations.

11.6.11 The baseline for comparing the effects of the Scheme are shown under 'Do-Minimum 2010' and represent a wide range of exposure to existing sources at:

- Houses and other sensitive buildings that are presently in quiet areas and in the vicinity of the Scheme;
- Houses and other sensitive buildings that may be affected by noise level increases on one side and decreases on the other side; and,
- Schools and other buildings and outdoor areas that may be especially sensitive to changes in noise.

11.6.12 In the following descriptions, noise levels given for existing and future operational impacts are $L_{A10, 18hr}$ noise levels unless otherwise stated. All noise levels are also taken as representing conditions at the façade of the first floor windows (assumed to be 4m above ground level) except where otherwise known. The number of properties represented by each receiver refers to residential properties only. Commercial and community receptors are identified separately in the assessment and shown as representing zero residential receivers in the following tables.

Hooe, Catsfield and Ninfield (Figures 11.5 to 11.12)

11.6.13 The roads that connect the A259 coast road to the villages of Hooe, Ninfield, Catsfield and the town of Battle are currently used as an alternative route for vehicles bypassing Bexhill and Hastings and passing to the A21 London Road through to the A259 east of Hastings. The character of the area is largely rural with intermittent linear development adjacent to these roads.

11.6.14 The Scheme is expected to reduce traffic noise impact on the Hooe Road between its junction with the A259 and Ninfield (Table 11.8). Similar reductions are expected through Catsfield. A minimal or slight decrease in road traffic noise levels is expected at residential properties in these areas. In and around Ninfield, properties would receive a minimal increase in traffic noise due to increased traffic on existing roads.

11.6.15 **Table 11.8 Traffic Noise Levels Hooe, Catsfield and Ninfield**

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
210	New Barn Farm (farm out-buildings)	0	47.0	43.1	48.2	44.0	-3.0	Slight decrease
211	New Barn Farm	2	65.1	60.7	66.2	61.8	-3.3	Slight decrease
212	Burrgroves	9	50.8	46.9	51.9	47.8	-3.0	Slight decrease
213	Glebe Cottage	14	65.3	61.4	66.5	62.5	-2.8	Minimal decrease
214	Nut Brown Farm	0	46.9	43.2	48.1	44.1	-2.8	Minimal decrease
215	The Parsonage Farm	21	51.4	48.0	52.6	49.0	-2.4	Minimal decrease
216	Hall's Cross Farmhouse	14	62.2	58.6	63.4	59.7	-2.5	Minimal decrease
217	Mill Bank Farm	0	43.1	39.8	44.4	40.8	-2.3	Minimal decrease
218	The Coach House	0	45.5	42.2	46.7	43.1	-2.4	Minimal decrease
219	Highfields	13	66.1	62.5	67.3	63.6	-2.5	Minimal decrease
220	Dewbys Farm	67	48.3	45.0	49.5	45.9	-2.4	Minimal decrease
221	The Old School	0	57.7	54.4	58.9	55.3	-2.4	Minimal decrease
222	Highland	40	64.4	60.8	65.6	61.9	-2.5	Minimal decrease
223	Woodland View	18	52.9	49.1	54.0	49.9	-3.0	Slight decrease
224	New House Barn	51	62.8	58.7	63.9	59.6	-3.2	Slight decrease
225	Chestnut Grove	16	42.2	38.7	43.3	39.6	-2.6	Minimal decrease
226	The Jays	47	66.5	63.7	68.4	65.4	-1.1	Minimal decrease
227	Eastlands Farm	1	52.5	49.7	54.4	51.4	-1.1	Minimal decrease
228	15 Skinner's Lane	40	44.6	41.8	46.5	43.5	-1.1	Minimal decrease
229	Wilton House Riding Centre	1	43.7	40.9	45.6	42.6	-1.1	Minimal decrease
230	Woodlands Farm	1	43.2	40.5	45.2	42.2	-1.0	Minimal decrease
231	The Emerald	36	58.7	58.2	61.0	60.6	1.9	Minimal increase
232	Little Standard Hill Farm	1	62.9	62.7	63.9	64.0	1.1	Minimal increase
233	Hazard's Green Farmhouse	19	67.2	67.0	68.2	68.3	1.1	Minimal increase
234	Quarry Works off A269	0	52.2	52.0	53.2	53.4	1.2	Minimal increase
235	Lower Standard Hill Farm	1	57.8	57.6	58.9	59.0	1.2	Minimal increase
236	Greytiles	101	67.6	67.4	68.7	68.8	1.2	Minimal increase
237	Myrtle Cottage	137	52.2	52.0	53.3	53.4	1.2	Minimal increase
238	11 Downs View	120	46.4	46.1	47.5	47.5	1.1	Minimal increase
239	Downsview	54	68.2	68.0	69.2	69.4	1.2	Minimal increase
240	Glendale	10	67.0	64.2	68.9	65.9	-1.1	Minimal decrease
241	Garage off A269	1	62.5	61.3	64.0	62.8	0.3	-
242	Robin Hood	7	55.4	54.9	57.3	57.0	1.6	Minimal increase
243	Stone Cottages	12	57.1	56.6	59.0	58.6	1.5	Minimal increase

Henley's Down to Crowhurst (Figures 11.19 & 11.20)

11.6.16 This area is characterised by scattered dwellings adjacent to the road interspersed with agricultural buildings and farms.

11.6.17 Currently, traffic using this road, apart from local traffic, is likely to be seeking to bypass the congested coast road and other main routes.

11.6.18 The Scheme is expected to bring benefit to properties fronting this road by reducing traffic on the road and producing a minimal reduction in traffic noise (Table 11.9).

Table 11.9 Traffic Noise Levels Henley's Down to Crowhurst

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
121	Prospect Lodge	15	61.4	59.0	64.2	59.8	-1.6	Minimal decrease
122	Uplands / Nashes Farm	10	50.4	48.1	53.2	48.8	-1.6	Minimal decrease
123	The Elms	12	60.4	58.0	63.2	58.8	-1.6	Minimal decrease
124	Mousecroft	18	62.2	59.8	65.0	60.6	-1.6	Minimal decrease

A259 London Road to Harley Shute Road (Figures 11.1 & 11.24 to 11.27)

11.6.19 This length of the A259 is characterised by predominantly residential development with a few commercial units, particularly in the area around Glyne Gap.

11.6.20 Traffic on this road consists of both through traffic passing along the coast and local traffic.

11.6.21 The Scheme is expected to result generally in no change to residential properties but some in the areas either side of the coast road, east of its junction with the Scheme, would benefit from a minimal decrease in traffic noise (Table 11.10).

Table 11.10 Traffic Noise Levels A259 London Road to Harley Shute Road

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
139	237 Bexhill Road	28	77.1	76.2	77.0	76.7	-0.4	-
142	330 Bexhill Road	92	73.1	72.2	73.0	72.7	-0.4	-
145	Carriage Shed off Cliftonville Road	1	47.6	46.0	47.0	46.6	-1.0	Minimal decrease
150	Garage off Bexhill Road	1	70.5	69.6	70.4	70.2	-0.3	-
151	Site off Bexhill Road	1	53.8	52.9	53.7	53.4	-0.4	-
152	440 Bexhill Road	174	73.8	73.0	73.8	73.2	-0.6	-
153	5 Hythe Avenue	118	49.1	48.2	49.0	48.4	-0.7	-
154	Ravenside Retail & Leisure Park	7	55.9	54.6	56.0	54.3	-1.6	Minimal decrease
155	Ravenside Retail & Leisure Park	1	68.5	67.1	69.1	67.3	-1.2	Minimal decrease
156	Ravenside Retail & Leisure Park	1	74.9	73.4	75.4	74.2	-0.7	-
157	Glynn Gap School / Pebsham County Primary School	1	51.6	50.5	51.8	50.8	-0.8	-
158	12 Glassenbury Drive	213	53.5	52.1	54.0	52.8	-0.7	-
159	157 / 159 De La Warr Road	77	72.1	70.6	72.7	71.5	-0.6	-
160	Warehouses on Brett Drive	10	54.3	52.9	54.8	53.6	-0.7	-
161	142 College Road	254	49.1	47.8	49.6	48.5	-0.6	-
162	134 De La Warr Road	34	68.7	67.2	69.2	68.0	-0.7	-
163	Building off Penland Road	0	46.1	44.9	46.6	45.3	-0.8	-
164	9 Woodland Rise	33	51.1	49.9	51.7	50.4	-0.7	-
165	14 Saxon Rise	47	50.3	49.1	50.9	49.6	-0.7	-
166	83 / 85 De La Warr Road	39	71.5	70.2	72.1	70.8	-0.7	-
167	3 Martlets	52	68.7	67.5	69.4	68.0	-0.7	-
168	63 Links Drive	35	46.0	44.9	46.7	45.4	-0.6	-
169	2 Elmstead Road	196	50.2	48.9	50.8	49.4	-0.8	-
170	74 Links Drive	59	47.3	46.2	48.0	46.8	-0.5	-
171	2 Fairmount Road	6	69.5	68.0	70.2	68.4	-1.1	Minimal decrease
172	54 Manor Road	80	56.9	56.0	57.6	56.6	-0.3	-
173	21 Portfield Close	289	52.4	50.7	53.0	51.1	-1.3	Minimal decrease
174	17 De La Warr Road	113	52.2	50.9	52.9	51.3	-0.9	-
175	15 Lychgates Close	33	70.6	68.7	71.2	68.9	-1.7	Minimal decrease
176	1 to 36 Peterhouse	48	70.4	68.5	71.0	68.7	-1.7	Minimal decrease
177	St Peters Church	1	54.9	53.5	55.6	54.0	-0.9	-
327	17 Sandown Way	217	46.0	45.6	46.7	46.0	0.0	-
328	5 Roundacres Way	30	63.9	63.8	64.7	64.1	0.2	-

Harley Shute Road (Figures 11.26 & 11.27)

11.6.22 Harley Shute Road links the A259 coast road to the Queensway and The Ridge. The area is largely residential in character with a static mobile home site at its southern end and extensive housing estates throughout its length.

11.6.23 Currently this road is used by traffic accessing the residential developments, the commercial areas around Queensway and to the Ridge and beyond.

11.6.24 Road traffic using Harley Shute Road is expected to reduce as a result of the Scheme but the resulting reduction in traffic noise would be minimal to many properties and not significant at others (Table 11.11).

Table 11.11 Traffic Noise Levels Harley Shute Road

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
129	214 Harley Shute Road	84	70.8	69.3	70.7	69.9	-0.9	-
130	20 Gillsman's Park	156	52.2	51.3	52.4	52.1	-0.1	-
131	5 Darwell Close	64	50.8	49.5	50.9	50.2	-0.6	-
132	35 Kite Close	77	69.1	67.5	69.2	68.1	-1.0	Minimal decrease
133	80 Reedswood Road	216	40.3	38.5	39.8	39.1	-1.2	Minimal decrease
134	27 Reedswood Road	94	48.0	46.0	47.2	46.7	-1.3	Minimal decrease
135	121 Edinburgh Road	114	42.7	40.7	41.8	41.4	-1.3	Minimal decrease
136	23 William Road	62	48.9	46.9	48.1	47.6	-1.3	Minimal decrease
137	55 Harley Shute Road	85	66.1	64.0	65.1	64.7	-1.4	Minimal decrease
138	9 Harley Way	37	50.5	48.6	49.6	49.2	-1.3	Minimal decrease
140	72 Bulverhythe Road	176	52.7	51.6	52.5	52.2	-0.5	-
141	Harley-Meads (Caravan Park) [Estimate]	200	50.5	49.5	50.4	50.1	-0.4	-
143	176 Bexhill Road	0	52.7	50.7	51.8	51.3	-1.4	Minimal decrease
144	Depot off Bexhill Road	0	47.3	45.4	46.5	46.1	-1.2	Minimal decrease
146	Saxon Mount School	0	45.6	43.7	44.9	44.4	-1.2	Minimal decrease
147	West St Leonards County Primary School	0	55.6	54.0	55.7	54.7	-0.9	-
148	The Grove School (South Façade)	0	49.1	48.0	49.3	48.8	-0.3	-
149	The Grove School (North Façade)	0	56.4	56.0	56.8	57.0	0.6	-

Queensway: from Harley Shute Road to the Scheme junction (Figures 11.27, 11.16 & 11.4)

11.6.25 The southern part of Queensway to its junction with the Crowhurst Road is mostly rural in character but with residential development, generally on one side and a railway in cutting to the west.

11.6.26 Traffic using this road is either accessing the residential areas, the industrial and commercial area on the northern end of the Queensway or passing through, bypassing Hastings town centre and seafront.

11.6.27 The Scheme is expected to increase the traffic on this road and result in no significant change or a slight increase in traffic noise at the adjacent residential areas (Table 11.12). Table 11.12 Traffic Noise Levels Queensway: from Harley Shute Road to the Scheme junction

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
127	10 Robsack Avenue	39	66.3	65.9	66.7	67.0	0.7	-
128	6 Ironlatch Close	140	45.6	45.3	46.0	46.3	0.7	-
244	Brunel Road Industrial Estate	0	51.2	54.2	52.6	54.7	3.5	Slight increase
245	55 Carpenter Drive	264	43.6	46.4	44.7	46.9	3.3	Slight increase

A259 Little Common to London Road (Figure 11.23)

11.6.28 This area is largely residential in character. The road is the main coastal road and there are few alternative routes for traffic.

11.6.29 The Scheme is expected to lead to an increase in traffic through this area with a consequent Minimal increase in traffic noise levels (Table 11.13).

Table 11.13 Traffic Noise Levels A259 Little Common to London Road

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
297	Adult Handicapped Centre	0	61.9	62.7	62.6	63.2	1.3	Minimal increase
298	2 Little Common Road	24	70.4	71.3	71.1	71.8	1.4	Minimal increase
299	7 Dalmeny Road	100	50.2	51.0	50.9	51.6	1.4	Minimal increase
300	22 Fowlers Close	13	67.4	68.4	68.2	68.9	1.5	Minimal increase
301	9 The Grove	16	69.6	70.5	70.3	71.0	1.4	Minimal increase
302	8 Eden Drive	202	48.7	49.7	49.4	50.2	1.5	Minimal increase
303	10 Fairfield Chase	24	71.0	72.0	71.7	72.4	1.4	Minimal increase
304	6 Cranston Close	45	48.2	49.3	49.0	50.0	1.8	Minimal increase
305	24 Pinewoods	44	46.7	47.2	47.2	47.9	1.2	Minimal increase
306	3 Robin Hill	46	70.2	70.7	70.9	71.0	0.8	-
307	5 Grenada Close	49	45.9	46.3	46.4	47.1	1.2	Minimal increase
308	11 Peartree Lane	169	48.8	49.2	49.4	49.9	1.1	Minimal increase
309	Harwell Little Common Road	37	75.5	75.9	76.0	76.7	1.2	Minimal increase
311	Church on Shepherd's Close / Church Hill Avenue	50	48.2	48.8	49.1	49.4	1.2	Minimal increase
312	40 to 42 Cooden Sea Road	64	69.0	69.8	70.0	70.2	1.2	Minimal increase
322	40 Sutherland Avenue	29	63.4	64.8	64.3	65.7	2.3	Minimal increase
323	20 Sutherland Avenue	20	64.4	65.4	65.2	66.6	2.2	Minimal increase
324	11 Holmesdale Road	55	44.1	45.0	44.8	45.7	1.6	Minimal increase
325	17 Willingdon Avenue	228	46.1	47.0	46.8	47.6	1.5	Minimal increase
326	53 Little Common Road	57	73.3	74.0	73.9	74.7	1.4	Minimal increase
329	St Mark's Church	0	72.6	72.8	73.0	73.9	1.3	Minimal increase
330	Little Common Country Primary School	0	54.2	53.6	54.7	55.4	1.2	Minimal increase
331	St Martha's Catholic Church	0	66.1	66.9	67.1	67.4	1.3	Minimal increase

Belle Hill Junction (Figure 11.1)

11.6.30 The area around the Belle Hill Junction is currently a busy interchange between the A259 coast road that joins Bexhill with Hastings, the main road in to Bexhill Town Centre and the link, the northern part of London Road, to Sidley, Ninfield and other settlements. South of the junction the London Road is largely commercial in character. The area has many commercial buildings, school buildings and community facilities with residential areas, particularly on London Road.

11.6.31 Properties which have façades facing onto the A259 to the east of the junction are expected to benefit from a minimal decrease in traffic noise as a result of the Scheme. The traffic noise level changes to areas to the south west of the junction are not considered to be significant.

11.6.32 The changes to traffic noise levels in this area are from changes in traffic flow that are due to the natural traffic growth or the minimal increase or minimal decrease which is expected to occur as a result of the Scheme. Properties in Amherst Road, which overlooks the Coast Road, would experience a slight increase in traffic noise level but the majority of residential properties would receive a minimal decrease in traffic noise (Table 11.14).

Table 11.14 Traffic Noise Levels Belle Hill Junction

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
1	42 Downlands	61	47.5	47.8	48.3	48.3	0.8	-
2	64 Downlands	40	60.6	59.7	61.5	60.1	-0.5	-
3	98 Reginald Road	78	46.9	46.2	47.5	46.7	-0.2	-
4	44 Amherst Road	189	60.2	61.7	61.4	63.3	3.1	Slight increase
5	84 London Road	51	55.4	54.2	56.0	54.5	-0.9	-
6	7 Millfield Rise	35	53.9	53.2	54.5	53.7	-0.2	-
7	78 Amherst Road	17	71.3	69.8	72.0	70.3	-1.0	Minimal decrease
8	6 Belle Hill	4	74.5	72.6	75.1	72.8	-1.7	Minimal decrease
9	60 Belle Hill	12	64.9	65.0	65.9	66.5	1.6	Minimal increase
10	Mercia Court	48	56.1	55.7	56.9	56.7	0.6	-
11	5 Hunting Close	8	70.1	68.1	70.7	68.3	-1.8	Minimal decrease
12	111 Belle Hill	10	58.2	56.7	58.9	57.2	-1.0	Minimal decrease
13	11 King Offa Way	6	74.5	72.8	75.1	73.0	-1.5	Minimal decrease
15	26 Salisbury Road	17	62.4	60.7	63.1	60.9	-1.5	Minimal decrease
16	10 Edinburgh Road	9	71.8	70.0	72.4	70.2	-1.6	Minimal decrease
18	13 Barrack Road	14	66.5	64.7	67.1	64.9	-1.6	Minimal decrease
19	20 Barrack Road	10	65.3	63.5	65.9	63.7	-1.6	Minimal decrease
20	5 Hanover Close	21	68.8	66.8	69.4	67.1	-1.7	Minimal decrease
21	52 Barrack Road	7	65.6	63.8	66.3	64.2	-1.4	Minimal decrease
98	Sports Centre Lit Com Rd	0	72.7	73.3	73.5	73.6	0.9	-
99	4 Beeching Road	0	59.6	60.1	60.2	60.3	0.7	-
100	Garage Beeching Rd	0	64.2	65.1	64.7	65.3	1.1	Minimal increase
101	St Peter & St Paul C of E JS	0	46.9	46.1	47.6	46.8	-0.1	-
102	Bexhill Down Cricket Grnd	0	58.1	58.2	58.9	58.6	0.5	-
104	Restaurant on corner London Rd	0	71.5	72.2	71.9	72.7	1.2	Minimal increase
105	Garage on A259	0	73.1	71.4	73.7	71.6	-1.5	Minimal decrease

Belle Hill Junction to Woodsgate Park Overbridge (Figure 11.1)

11.6.33 Through this section of the route, going south to north, the Scheme departs from the alignment of the existing London Road and enters the abandoned railway cutting. There are a considerable number of residential properties on the western side of the Scheme currently separated from the London Road by a line of houses and the abandoned railway cutting. Properties between the cutting and London Road currently receive traffic noise from that road on their front façades.

11.6.34 Some properties would be demolished to make way for the Scheme and the Leisure Centre and the Bexhill High School would lose the benefit of demolished intervening properties as barriers to traffic noise.

11.6.35 The traffic noise level increase is expected to be a substantial to major increase in this area to properties on the western side of the Scheme, with a slight to moderate increase to properties on the eastern side of the proposed road which currently have façades facing London Road. Some residential properties in this area may qualify for an offer of insulation under the Noise Insulation Regulations.

11.6.36 Properties facing London Road are expected to receive traffic noise level increases due to the expected growth in traffic whether or not the Scheme is constructed. Properties which have a façade facing the cutting, including those with a front façade facing London Road, would receive a substantial to major increase in traffic noise level.

11.6.37 The front façade of properties facing London Road would receive a minimal to slight increase in traffic noise. Bexhill High School would receive a substantial increase in traffic noise (Table 11.15).

Table 11.15 Traffic Noise Levels Belle Hill Junction to Woodsgate Park Overbridge

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
14	112 London Road	10	69.6	71.9	70.0	72.6	3.0	Slight increase
17	27 Salisbury Road	55	55.2	54.5	55.8	54.8	-0.4	-
22	130 London Road	7	68.7	69.9	69.1	70.6	1.9	Minimal increase
23	140 London Road	8	66.1	66.7	66.5	67.4	1.3	Minimal increase
24	Chantry County Primary School	0	55.3	53.7	55.9	54.0	-1.3	Minimal decrease
25	7 Dayencourt North	141	51.3	52.0	51.9	52.6	1.3	Minimal increase
26	162 London Road	16	66.9	67.9	67.3	68.6	1.7	Minimal increase
27	7 St Patrick's Crescent	124	51.1	50.1	51.9	50.9	-0.2	-
28	173 London Road (Rear)	17	48.9	66.0	49.5	67.2	18.3	Major increase
29	173 London Road (Front)	17	68.9	69.0	69.3	69.7	0.8	-
30	4 Bending Crescent	19	61.2	61.7	61.6	62.5	1.3	Minimal increase
31	209 & 211 London Road	12	63.5	64.1	64.0	65.0	1.5	Minimal increase
32	51 Bancroft Road	13	47.8	60.2	48.4	61.3	13.5	Substantial increase
33	27 Bancroft Road	10	49.8	54.1	50.5	55.0	5.2	Moderate increase
34	26 Bancroft Road	30	50.7	61.4	51.3	62.5	11.8	Substantial increase
35	9 Bancroft Road	12	50.5	54.5	51.2	55.4	4.9	Slight increase
46	Bexhill High School (south-east)	0	51.7	63.0	52.3	63.9	12.2	Substantial increase
47	Bexhill High School (north-east)	0	49.7	59.6	50.4	60.6	10.9	Substantial increase
103	Leisure Centre off Down Road	0	53.6	65.3	54.3	65.9	12.3	Substantial increase
106	Bexhill Hospital	0	49.7	49.0	50.4	49.6	-0.1	-
116	Recreation Ground by Bending Crescent	0	59.6	60.5	60.1	61.3	1.7	Minimal increase

Woodsgate Park Overbridge to Ninfield Road Overbridge (Figure 11.1)

11.6.38 The route of the Scheme in this section is deep within the abandoned cutting through residential developments on either side with Buxton Drive, Birchview, Highfield Gardens and the Sidley County Primary School being the most affected. The façades facing towards the Scheme are expected to experience a slight to substantial increase in traffic noise level over the 15 years of the assessment period.

11.6.39 The cutting widens through what may have been sidings or goods yards and is currently in use commercially and as a local authority depot.

11.6.40 To the east of the Scheme, the rear façades of properties which face onto London Road would become directly exposed to traffic noise from the new road and would experience a substantial increase in traffic noise level, with the effect decreasing as the road becomes lower and passes under the Ninfield Road Overbridge (Table 11.16).

Table 11.16 Traffic Noise Levels Woodsgate Park Overbridge to Ninfield Road Overbridge

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
36	27 Woodsgate Park	78	48.9	50.4	49.6	51.2	2.3	Minimal increase
37	20 Dane Court	15	56.6	58.5	57.5	59.5	2.9	Minimal increase
38	124 Buxton Drive	13	51.3	54.8	52.1	55.9	4.6	Slight increase
39	113 Buxton Drive	16	51.5	61.6	52.3	62.6	11.1	Substantial increase
40	12 to 16 Rother	16	53.8	66.5	54.7	67.7	13.9	Substantial increase
41	7 to 12 Honies	22	49.3	60.4	50.0	61.6	12.3	Substantial increase
42	7 to 12 Honies	22	69.0	68.2	69.7	69.0	0.0	-
43	192 London Road	13	70.7	70.2	71.4	71.0	0.3	-
44	18 Woodsgate	112	54.6	54.7	55.3	55.6	1.0	Minimal increase
45	52 Beaconsfield	97	48.5	49.2	49.2	50.0	1.5	Minimal increase
48	14 Grange Court	47	46.2	48.7	46.9	49.6	3.4	Slight increase
49	76 Buxton Drive	26	47.0	50.6	47.8	51.6	4.6	Slight increase
50	75 Buxton Drive	35	47.7	54.5	48.4	55.6	7.9	Moderate increase
51	279 London Road	73	48.0	60.6	48.8	61.8	13.8	Substantial increase
52	53 Havelock Road	26	60.4	61.1	61.1	61.9	1.5	Minimal increase
53	238 London Road	18	69.3	68.2	70.0	69.1	-0.2	-
54	40a Hollier's Hill	86	67.6	67.8	69.2	69.6	2.0	Minimal increase
55	14 St James' Road	96	48.0	49.4	49.2	50.6	2.6	Minimal increase
57	15 Birchview	22	48.6	58.0	49.4	59.1	10.5	Substantial increase
58	27 Buxton Drive	21	47.6	51.3	48.4	52.2	4.6	Slight increase
59	22 Buxton Drive	30	48.6	51.0	49.4	51.9	3.3	Slight increase
60	29 Bodle Crescent	58	46.9	49.1	47.7	50.0	3.1	Slight increase
61	Sidley County PS	0	53.2	56.5	54.0	57.4	4.2	Slight increase
62	3 Highfield Gardens	6	60.5	62.7	61.3	63.6	3.1	Slight increase
63	5a Ninfield Road	15	55.1	55.5	55.8	56.2	1.1	Minimal increase
107	Recreation Grnd Canada Way	0	43.7	46.0	44.4	46.9	3.2	Slight increase
109	63 Holliers Hill	1	59.0	58.9	60.0	59.9	0.9	-
110	63 Holliers Hill	1	72.4	71.0	73.4	72.0	-0.4	-
111	63 Holliers Hill	1	70.7	69.7	71.5	70.7	0.0	-

Ninfield Road Overbridge to Glover's Farm (Figure 11.1)

11.6.41 Close to the bridge there are residential properties on both sides of the new alignment, and then the boundary of the developed area is passed before the road passes under what is currently the Glover's Farm access. Some of these properties which have a direct view into the cutting would experience a moderate to major increase in traffic noise level (Table 11.17).

11.6.42 The noise climate at Glover's Farm is not dominated by traffic noise in the Do-Minimum situation. Therefore, the comparison of noise change between the Do-Minimum and Do-Something scenarios has been considered. The advice given in DMRB that the ambient noise level should be determined from measurements of $L_{A90,18hr}$ taken over several days during the assessment period to determine the influence of different weather conditions has been used.

11.6.43 Accordingly, at this and other receptors where this is appropriate (marked by an asterisk in the in the following tables) the $L_{A90,18\ hr}$ has been used as a comparator. It is expected that these properties would be subject to a substantial or major increase in traffic noise level.

Table 11.17 Traffic Noise Levels Ninfield Road Overbridge to Glover's Farm

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
56	Pelham Hotel,	12	71.0	70.7	71.8	71.3	0.3	-
64	1 to 37 Auckland	37	56.8	69.1	57.5	70.2	13.4	Substantial increase
65	9 Wrestwood Road	30	69.5	69.1	70.3	69.7	0.2	-
66	29 St James' Ave	22	44.1	50.5	44.9	51.5	7.4	Moderate increase
67	10 St James' Ave	34	47.3	48.3	48.0	49.1	1.8	Minimal increase
68	30 St James' Cres.	46	44.7	47.5	45.5	48.3	3.6	Slight increase
69	3 St James' Close	14	42.1	51.0	42.9	52.1	10.0	Substantial increase
70	35 St James' Cres.	14	41.4	57.4	42.3	58.5	17.1	Major increase
71	7 St James' Close	4	41.4	64.9	42.2	66.0	24.6	Major increase
72	1 to 31 Strome House	41	64.1	68.1	64.9	69.1	5.0	Moderate increase
73	19 Meadow Cres.	89	44.6	48.3	45.4	49.2	4.6	Slight increase
74	7 Elderwood Close	14	40.1	58.4	40.9	59.5	19.4	Major increase
75	1 Glovers Lane	60	54.6	54.7	55.4	55.3	0.7	-
76	17 Crowhurst Lane	80	40.7	45.1	41.7	46.0	5.3	Moderate increase
77	12 Glenburn Close	28	39.5	53.0	40.4	54.1	14.6	Substantial increase
78*	Glovers Farm (north)	1	34.1	56.3	34.1	57.4	23.3	Major increase
79*	Glovers Farm	1	34.1	47.1	34.1	48.1	14.0	Substantial increase

Notes:

** Baseline adjusted from survey data*

Glover's Farm to Acton's Farm (Figure 11.2)

11.6.44 Through this section of the Scheme the alignment is descending towards the river valley, still mostly in cutting but diverging from the abandoned railway line.

11.6.45 The area is naturally quiet with the fringe of the populated area to the northwest characteristically a quiet, residential area becoming a farmed landscape with distant traffic noise sources.

11.6.46 Noise increase in this section of the route is due to the introduction of a new source of traffic noise, the Scheme, into what is currently a quiet, rural area. Again, the assessment is made by comparing the existing, measured $L_{A90,18\ hr}$ background noise levels with the predicted traffic noise levels due to the Scheme. It is expected that these properties would be subject to a major increase in traffic noise (Table 11.18).

Table 11.18 Traffic Noise Levels Glover's Farm to Acton's Farm

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
80*	Buckholt Kennels	1	31.3	56.7	31.3	57.5	26.2	Major increase
81*	Actons Farm	1	34.0	54.6	34.0	55.4	21.4	Major increase
82*	Little Actons	1	34.0	53.1	34.0	54.0	20.0	Major increase
83*	Actons Cottage	1	34.0	50.9	34.0	51.7	17.7	Major increase

Notes:

** Baseline adjusted from survey data*

Acton's Farm to Byne's Farm/Hillcroft Farm track (Figures 11.2 & 11.3)

11.6.47 The Scheme is on the embankment across the river valley plain through this section with a scattered, residential development to the north. This area is sufficiently distant from roads that traffic noise is practically inaudible and the existing noise climate is dominated by other natural or agricultural sources.

11.6.48 In the vicinity of Hillcroft and Henniker Farms noise levels and observations recorded during the noise level survey suggest that whilst road traffic may not be the dominant source of noise, other activity in the immediate locality is contributing to the background noise levels. These properties are also remote from the Scheme's alignment and the traffic noise increase is expected to vary from minimal to major with the distance of the property from the proposed road (Table 11.19).

Table 11.19 Traffic Noise Levels Acton's Farm to Byne's Farm/Hillcroft Farm Track

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
84*	1 Buckholt Cottages	2	45.0	47.0	45.0	47.8	2.8	Minimal increase
85*	Byne's Farm	1	35.0	51.0	35.0	51.9	16.9	Major increase
86	Hillcroft Farm	1	39.5	45.5	41.8	46.5	7.0	Moderate increase
112	Henniker Farm	2	30.0	46.8	30.0	47.7	17.7	Major increase

Notes:

** Baseline adjusted from survey data*

Byne's Farm/Hillcroft Farm track to Decoy Pond Wood (Figures 11.3 & 11.4)

11.6.49 The Scheme is in cutting and then embankment through this area and some mitigation of the traffic noise effects is expected from proposed landscape bunding.

11.6.50 Again, this area is sufficiently distant from roads that traffic noise is practically inaudible and the existing noise climate is dominated by other natural or agricultural sources. A major increase in traffic noise level would therefore result through this section of the route (Table 11.20).

Table 11.20 Traffic Noise Levels Byne's Farm/Hillcroft Farm track to Decoy Pond Wood

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do ething 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
87*	Adams Farm	1	31.0	58.8	31.0	59.9	28.9	Major increase
88*	Adams Farm (east)	1	31.0	55.4	31.0	56.5	25.5	Major increase

Notes:

** Baseline adjusted from survey data*

Decoy Pond Wood to Queensway (Figure 11.4)

11.6.51 The route here is approaching the junction of the Crowhurst Road with Queensway, passing through a cutting, emerging onto embankment as it passes over the realigned Crowhurst Road, and then onto embankment to cross over the railway line to the junction with Queensway.

11.6.52 There are a few isolated residential properties in this area and the traffic noise levels are predicted to undergo a slight decrease due to the implementation of the Scheme (Table 11.21). One property, The Briars, would receive a minimal increase in traffic noise level.

Table 11.21 Traffic Noise Levels Decoy Pond Wood to Queensway

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
89	The Briars	1	60.1	58.8	62.4	59.5	-0.6	-
90	Lower Wilting Farm	1	53.9	54.5	56.2	55.3	1.4	Minimal increase
91	Upper Wilting Farm	1	56.0	55.7	57.7	56.6	0.6	-
92	2 Upper Wilting	5	67.9	63.9	69.7	64.3	-3.6	Slight decrease

Queensway Junction (Figure 11.4)

11.6.53 The junction is on a long curve of Queensway with residential development to the east within the curve. There are a number of community facilities in this area.

11.6.54 Traffic noise increases at properties in this area are expected to be of no significance or minimal to slight increases and a minimal decrease at properties in Flimwell Close and Whatlington Way (Table 11.22).

Table 11.22 Traffic Noise Levels Queensway Junction

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
93	15 Watermill Drive	26	61.4	65.2	62.8	65.9	4.5	Slight increase
94	38 Watermill Drive	49	47.8	49.2	49.1	50.0	2.2	Minimal increase
95	14 Hartfield Meadow	155	46.2	45.4	47.1	46.5	0.3	-
96	14 Flimwell Close	17	52.4	49.5	53.6	50.9	-1.5	Minimal decrease
97	30 Whatlington Way	74	57.4	54.5	58.4	56.3	-1.1	Minimal decrease
108	Robsack Wood CP School	0	49.7	49.1	50.4	50.0	0.3	-
113	Mayfield Farm	1	58.7	57.6	60.1	58.8	0.1	-
114	Community	0	51.4	49.8	52.7	51.1	-0.3	-
115	Community	0	51.7	50.5	52.9	51.8	0.1	-

The Ridge – Queensway to Ore (Figures 11.13 to 11.15)

11.6.55 The Ridge is very mixed in character, there being extensive residential development along its length, predominantly in the eastern end but there are also significant numbers of commercial premises, schools and public services. There is also an extensive cemetery to the north of The Ridge.

11.6.56 Traffic flows on The Ridge are predicted to increase as a result of the Scheme with a consequent minimal to slight increase in traffic noise to residential properties in this area (Table 11.23).

Table 11.23 Traffic Noise Levels The Ridge - Queensway to Ore

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
178	My Way Lodge off the Ridge West	0	65.0	65.4	65.6	65.6	0.6	-
179	Store off Sedlescombe Road North	13	56.1	56.7	56.8	57.3	1.2	Minimal increase
180	14/16 Westfield Lane	56	47.0	47.7	47.7	48.1	1.1	Minimal increase
181	220 Harrow Lane	10	66.6	67.3	67.2	67.8	1.2	Minimal increase
182	786 The Ridge	33	67.7	68.4	68.4	69.0	1.3	Minimal increase
183	Beaulieu Farm, The Ridge	7	69.1	69.8	69.8	70.4	1.3	Minimal increase
184	2 Francis Bird Place	34	67.4	68.1	68.1	68.7	1.3	Minimal increase
185	Helenswood School Maplehurst	0	60.1	60.7	60.8	61.4	1.3	Minimal increase
186	Conquest Hospital	0	60.9	61.6	61.6	62.2	1.3	Minimal increase
187	Leisure Centre off the Ridge	0	66.1	66.8	66.9	67.6	1.5	Minimal increase
188	34 Chanctonbury Drive	260	47.2	47.9	48.1	48.8	1.6	Minimal increase
189	16 Park Wood Road	42	51.1	51.7	51.9	52.7	1.6	Minimal increase
190	4 Sandrock Park	14	60.2	60.8	61.0	61.7	1.5	Minimal increase
191	11 The Dene	11	64.6	65.0	65.4	66.0	1.4	Minimal increase
192	3 Denehurst Gardens	50	50.5	51.0	51.4	52.0	1.5	Minimal increase
193	14 De Chardin Drive	20	63.2	63.6	64.0	64.6	1.4	Minimal increase
194	Osborne House, The Ridge	0	63.6	64.2	64.3	64.8	1.2	Minimal increase
195	2 Pilot Road	44	57.7	58.3	58.3	58.7	1.0	Minimal increase
196	St Helen's Cemetery	0	54.0	54.6	54.7	55.2	1.2	Minimal increase
197	Helenswood School	0	70.3	70.9	70.9	71.3	1.0	Minimal increase
198	200 The Ridge	40	62.5	63.1	63.2	63.6	1.1	Minimal increase
199	Pine Hill, St Helen's Down	15	59.7	60.3	60.4	60.8	1.1	Minimal increase

200	Ivy House Lane	0	63.1	63.6	63.8	64.1	1.0	-
201	5 Playden Gardens	10	66.1	66.6	66.7	67.1	1.0	Minimal increase
202	131 The Ridge	19	65.6	66.1	66.3	66.6	1.0	Minimal increase
203	50 The Ridge	0	68.9	69.3	69.6	69.8	0.9	-
204	59 The Ridge	41	69.4	69.8	70.1	70.3	0.9	-
205	Fire Station off the Ridge	0	67.4	67.8	68.1	68.3	0.9	-
ID No.	**Receiver**	**No of Residential Properties**	**Do Minimum 2010**	**Do Something 2010**	**Do Minimum 2025**	**Do Something 2025**	**Noise level change DS2025-DM2010**	**Significance**
			LA10, 18hr	**LA10, 18hr**	**LA10, 18hr**	**LA10, 18hr**		
			dB(A)	**dB(A)**	**dB(A)**	**dB(A)**		
206	28 The Ridge	6	67.6	68.1	68.3	68.6	1.0	Minimal increase
207	School	0	56.9	57.3	57.6	57.8	0.9	-
208	Winchelsea Road	17	57.3	57.8	58.0	58.4	1.1	Minimal increase
209	Old London Road	44	70.2	70.7	70.9	71.3	1.1	Minimal increase
247	6 Crecy Close	90	48.2	50.6	48.9	51.1	2.9	Minimal increase
248	7 Beauport Gardens	12	62.4	65.0	63.1	65.5	3.1	Slight increase
249	3 Beauport Home Farm Close	15	65.3	67.9	66.0	68.4	3.1	Slight increase
250	28 Beauport Home Farm Close	53	53.5	56.1	54.2	56.6	3.1	Slight increase
251	Ashdown House (Government Offices)	0	51.1	53.1	51.9	53.5	2.4	Minimal increase
252	15 Downey Close	105	44.5	44.9	45.6	45.9	1.4	Minimal increase
253	20 Greenfields Close	80	45.6	46.3	46.5	47.1	1.5	Minimal increase
254	207 Harrow Lane	19	67.6	67.5	68.9	68.9	1.3	Minimal increase
255	441 The Ridge	77	69.3	70.0	70.2	70.9	1.6	Minimal increase
256	406 The Ridge	29	69.5	70.2	70.4	71.1	1.6	Minimal increase
257	14 Vinehall Close	53	46.0	46.5	46.8	47.4	1.4	Minimal increase
258	4 Kildare Close	49	45.9	46.5	46.6	47.0	1.1	Minimal increase
259	57a Pine Avenue	37	47.4	47.9	48.1	48.5	1.1	Minimal increase
260	163 Malvern Way	156	47.2	47.7	47.9	48.2	1.0	Minimal increase
261	93 Victoria Avenue	251	43.1	43.5	43.8	44.1	1.0	Minimal increase
262	45 Victoria Avenue	197	43.1	43.5	43.8	44.1	1.0	Minimal increase
263	53 Grove Road	130	46.7	47.2	47.4	47.8	1.1	Minimal increase
264	Store off Rye Road	1	47.4	47.9	48.1	48.5	1.1	Minimal increase
265	Christ Church on Old London Road	1	40.2	40.7	40.9	41.3	1.1	Minimal increase
266	Industrial Estate Haywood Way	0	49.4	49.9	50.1	50.4	1.0	Minimal increase

Telham Forge to Queensway (Figure 11.17)

11.6.57 The area through which this road passes is predominantly rural in character but there is a significant area of residential development close to the junction with Queensway.

11.6.58 There are no significant traffic noise level changes expected as a result of the Scheme (Table 11.24).

Table 11.24 Traffic Noise Levels Telham Forge to Queensway

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
267	Moonrakers Hastings Road	14	69.4	68.3	69.8	69.2	-0.2	-
268	179 Hastings Road	39	74.6	73.5	75.1	74.4	-0.2	-
269	124 Hastings Road	36	68.4	67.3	68.9	68.2	-0.2	-

Crowhurst (Figures 11.17 to 11.19)

11.6.59 In the area in and around Crowhurst Village traffic noise levels are currently due to traffic on several minor roads which pass through the Parish, with both local and, reportedly, rat-running through-traffic contributing.

11.6.60 The implementation of the Scheme would result in no change in traffic noise level immediately and the calculations show minimal traffic noise increase by 2025. Without the Scheme the traffic noise increases would be slight, up to 4dB.

11.6.61 There are many properties in the village of Crowhurst which may potentially benefit, as a result of the Scheme, from the offsetting of the expected increases in traffic noise which would otherwise accrue from the predicted Do-Minimum traffic growth. The overall result of the Scheme would be a minimal increase in traffic noise level through this area at many properties (Table 11.25).

Table 11.25 Traffic Noise Levels Crowhurst

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
270	St Ann's Telham Lane	24	54.3	54.3	58.3	55.3	1.0	Minimal increase
271	Sloane Cottage Forewood Lane	23	51.3	51.4	55.1	52.4	1.1	Minimal increase
272	The Old Rectory (Nursing Home) Forewood Lane	0	40.1	40.1	43.7	41.2	1.1	Minimal increase
273	Burnhams Forewood Lane	66	53.6	53.6	57.7	54.7	1.1	Minimal increase
274	Lilac Spinney Station Road	40	68.4	68.4	69.0	69.0	0.6	-
275	Farmhouse on Station Road	0	59.1	59.0	59.7	59.6	0.5	-
276	Statton House Craig Close	28	56.8	56.8	57.4	57.4	0.6	-
277	Springfields	9	68.0	67.6	68.6	68.4	0.4	-

Crowhurst to Queensway (Figures 11.3 to 11.4)

11.6.62 This area is sparsely developed with a few scattered dwellings and occasional farms. The road is a continuation of the road to Henley's Down and as such shares the problem of bypassing traffic which is exacerbated by the availability of the option of passing along the north-south route through Crowhurst to The Ridge.

11.6.63 The Scheme is expected to lead to a reduction in traffic on this road producing a minimal decrease in traffic noise at some properties. Many properties in this area may potentially benefit, as result of the Scheme, from the offsetting of the expected increases in traffic noise which would otherwise accrue from the predicted Do-Minimum traffic growth. The overall result of the Scheme would be a minimal decrease in traffic noise level through this area at many properties (Table 11.26).

Table 11.26 Traffic Noise Levels Crowhurst to Queensway

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
117	Four Winds Cottage	2	66.3	64.3	68.6	65.1	-1.2	Minimal decrease
118	Whitefields / Woodside	6	50.0	49.6	52.3	50.3	0.3	-
119	2 Woodland Way	8	46.4	44.6	48.7	45.2	-1.2	Minimal decrease
120	Wheelers Yard / Florida	65	58.9	56.9	61.2	57.6	-1.3	Minimal decrease

Watermill Lane (Figures 11.20 to 11.21)

11.6.64 This area is lined by a few scattered dwellings and occasional farms. The road is a continuation of the road from Crowhurst to Henley's Down and as such shares the problem of bypassing traffic.

11.6.65 The Scheme is expected to result in no significant traffic noise level change overall but properties in this area may potentially benefit, as a result of the Scheme, from the offsetting of the expected increases in traffic noise which would otherwise accrue from the predicted Do-Minimum traffic growth (Table 11.27).

Table 11.27 Traffic Noise Levels Watermill Lane

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
125	Watermill Shaw	25	63.5	61.5	66.0	63.1	-0.4	-
126	Cobb's Hill Farm	6	62.3	60.3	64.7	61.9	-0.4	-

Sidley (Figures 11.11 & 11.22)

11.6.66 Sidley is a large and busy village now a sub-section of the Bexhill built-up area. There is a shopping centre and residential development on the main Ninfield Road which passes through the village.

11.6.67 The Scheme would offset the traffic noise levels which would otherwise have occurred through the village and result in a no change to minimal increase in traffic noise by 2025 (Table 11.28).

Table 11.28 Traffic Noise Levels Sidley

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
280	21 Cooper Drive	255	43.2	42.2	45.3	43.5	0.3	-
281	Dell View, Watermill Lane	75	68.6	66.8	70.9	68.5	-0.1	-
282	37 Faygate Close	107	45.2	44.0	47.4	45.5	0.3	-
283	5 Preston Road	244	46.7	47.5	47.9	48.3	1.6	Minimal increase
284	All Saints' Church	0	58.9	59.5	60.0	60.0	1.1	Minimal increase
285	All Saints C of E School	0	57.7	58.1	58.8	58.7	1.0	Minimal increase
286	57 Edmonton Road	99	49.4	50.2	50.5	50.8	1.4	Minimal increase
287	73 Ninfield Road	19	74.5	74.3	75.5	75.1	0.6	-
288	76/78 Ninfield Road	21	63.7	64.0	64.7	64.7	1.0	Minimal increase
289	9 Sidley Street	61	50.4	51.8	51.4	52.6	2.2	Minimal increase

Broadoak Lane and St Mary's Lane (Figures 11.22 & 11.23)

11.6.68 This lane passes through the urban fringe linking the A259 with the rural areas to the north.

11.6.69 The Scheme would result in increased traffic and lead to a minimal increase in traffic noise by 2025 (Table 11.29).

Table 11.29 Traffic Noise Levels Broadoak Lane and St. Mary's Lane

ID No.	Receiver	No of Residential Properties	Do Minimum 2010	Do Something 2010	Do Minimum 2025	Do Something 2025	Noise level change DS2025-DM2010	Significance
			LA10, 18hr	LA10, 18hr	LA10, 18hr	LA10, 18hr		
			dB(A)	dB(A)	dB(A)	dB(A)		
278	8 The Ridings	33	58.7	60.1	59.2	61.1	2.4	Minimal increase
279	39 Clich Green Avenue	174	39.2	40.5	39.8	41.4	2.2	Minimal increase
290	Cherry View Ellerslie Lane	59	60.0	61.7	60.9	62.3	2.3	Minimal increase
291	17 Fryatts Way	26	43.7	45.2	44.6	45.8	2.1	Minimal increase
292	29 Broad View	134	40.9	42.0	41.7	42.6	1.7	Minimal increase
293	12 Foxhill	22	47.1	47.6	47.7	48.4	1.3	Minimal increase
294	2 Deerswood Lane	62	63.3	64.4	64.2	65.7	2.4	Minimal increase
295	6 Bale Close	128	44.8	45.8	45.6	46.3	1.5	Minimal increase
296	17 Millham Close	137	43.2	44.1	43.9	44.8	1.6	Minimal increase

Public footpaths and bridleways

11.6.70 The area of the route which passes through the river valley is traversed by the 1066 Country Walk and other footpaths and bridleways. Currently users of these routes are remote from the noises and activities associated with road traffic. With the implementation of the Scheme the users of these paths would become subject to traffic noise from the new road, the level of traffic noise being dependant on distance from the new road and the degree of attenuation offered by any incorporated mitigation. Figure 11.31 shows the traffic noise level contours for the Scheme. The effects are discussed in detail in Chapter 15A: Pedestrians, Cyclists and Recreational Users.

The Combe Haven Valley

11.6.71 The area of the river valley has few residential properties. These have all been included in the assessment, however this does not address the effects of the Scheme on members of the public who use the existing footpath and bridleway network or who may use the area for recreation.

11.6.72 Traffic noise effects, issues of tranquillity in areas of countryside and the users of the public footpaths, bridleways and other public access facilities are addressed in Chapter 13: Landscape and Visual Impact and Chapter 15A: Pedestrians, Cyclists and Recreational Users.

Summary

General

11.6.73 Road traffic noise effects on opening of the Scheme broadly fall into three categories:

- Those resulting from an off-line improvement where new carriageways would be constructed;
- Those resulting from on-line works where the existing road would be widened without significant re-alignment. The noise effect would be from the increased traffic flow and traffic speed; and,
- Those resulting from changes in traffic flow, composition and speed on the existing road network as a result of the construction of the Scheme.

11.6.74 The following sections consider the effects on representative receptors by comparing predicted noise levels between scenarios. Noise changes and absolute noise levels are quoted to the nearest whole dB, although the noise assessments are based on values to one decimal place.

11.6.75 Four different scenario comparisons are considered as follows, where Do Minimum denotes the scenario without the Scheme, and Do Something denotes the scenario with the Scheme:

- Do-Minimum (DM) in 2025 compared to DM (baseline) conditions in 2010; the expected basic increase in traffic flow with time;
- Do-Something (DS) in 2025 compared to DM (baseline) in 2010; for both the DMRB assessment of the Scheme and for WebTAG;
- DS in 2010 compared to Do Minimum (baseline) conditions in 2010, the step change for nuisance assessment (see Table 11.31 and Appendix 11-A); and,
- DS 2025 compared to DM in 2025 for the WebTAG assessment which returns a monetary value for the noise effects of the Scheme (see Appendix 11-C).

11.6.76 All scenario comparisons are considered in detail below apart from the first one which only reflects noise increases due to traffic growth unrelated to the Scheme.

11.6.77 Noise contour plans showing 2010 DM level are given in Figure 11.30 and noise contours for 2025 DS levels are given in Figure 11.31.

Effects in the Design Year compared with Opening Year (DS 2025 & DM2025 v DM 2010)

11.6.78 This assessment shows the effects of the DS scenario and the noise effects of traffic growth. The results of this assessment are given in Table 11.30 and Appendix 11-A.

Table 11.30 Noise Assessment Opening Year DM v Design Year DM and DS (2010 v. 2025)

All Ambient Bands		Residential		Commercial		Community	
		Scheme	Do Minimum	Scheme	Do Minimum	Scheme	Do Minimum
Increase in Noise Level	1<3	5873	2953	52	3	9	3
	3<5	917	114	103	0	1	0
	5<10	189	0	0	0	0	0
	10<15	272	0	1	0	3	0
	>=15	59	0	0	0	0	0
Decrease in Noise Level	1<3	1655	85	9	0	10	0
	3<5	85	0	1	0	0	0
	5<10	0	0	0	0	0	0
	10<15	0	0	0	0	0	0
	>=15	0	0	0	0	0	0

11.6.79 The assessment is shown as the total effects for all ambient bands in Table 11.30 and classified by ambient noise level bands in Appendix 11-A.

11.6.80 It is predicted that 3,067 residential properties would experience an increase in traffic noise by the year 2025 of 1 to 5dB $L_{Aeq,18\ hr}$ without the Scheme. Predictions also suggest that 85 properties in Harley Shute Road would benefit from at least a 1 dB $L_{Aeq,18\ hr}$ reduction without the Scheme.

11.6.81 With the Scheme the road traffic noise summary assessment shows that 1,655 dwellings would benefit from minimal decreases and 85 a slight decrease whereas 7,310 residential properties would receive at least a minimal 1 dB(A) increase in traffic noise level with 59 of these receiving a 15dB(A) or greater major increase.

Traffic Noise Nuisance Assessment (DM2010 v DM2025 and DS2025)

11.6.82 DMRB requires the assessment of nuisance to take account of the highest level of nuisance which would occur either due to the immediate effects of a scheme at opening or the maximum effect within 15 years, whichever is the greater. This is compared to the DM opening year nuisance. Generally the maximum level of nuisance is in the fifteenth year after opening of a scheme

11.6.83 In accordance with DMRB, noise nuisance assessments have been made for DM in 2025 compared with DM in 2010 and DS in 2025 compared with DM in 2010. This applies to residential receptors only. The results are presented in Table 10.31. The results are also presented in the set of Noise Assessment Summary Tables, Tables 11-A.5 to 11-A.8 in Appendix 11-A.

11.6.84 Nuisance is measured as the percentage of people bothered by traffic noise (i.e. those who say they are bothered 'very much' or 'quite a lot' on a four point worded scale). Figure 3 of DMRB shows a relationship between changes in noise nuisance (on the same nuisance scale) and changes in noise exposure.

11.6.85 For the DM (2025 v 2010), it can be seen from Table 11.31 that there would be increases in people bothered quite a lot or very much in the 0% to 10% level for 3,067 dwellings by 2025 if the Scheme were not built. There would be no greater increases and no decreases in noise nuisance.

11.6.86 With the Scheme (2025 v 2010 DM), 7,310 properties would experience an increase in nuisance with 366 of those properties experiencing an increase in nuisance at a level of 40% or more.

11.6.87 1,740 properties are expected to benefit from an up to 10% reduction in noise nuisance as a result of the Scheme.

Table 11.31 Noise Nuisance Assessment in the Design Year vs Opening Year 2010 (DS 2025 v DM 2025)

All Ambient Bands		**Residential**	
		Scheme	**Do Minimum**
Increase in Nuisance Level	0 TO <10%	597	3067
	10% TO <20%	2912	0
	20% TO<30%	3094	0
	30% TO <40%	341	0
	>=40%	366	0
Decrease in Nuisance Level	0 TO <10%	1740	0
	10% TO <20%	0	0
	20% TO<30%	0	0
	30% TO <40%	0	0
	>=40%	0	0

Noise Insulation Regulations

11.6.88 A preliminary assessment of properties that may be eligible for an offer of noise insulation for traffic noise under the Noise Insulation Regulations 1975 (as amended 1988) has been made. 18 properties may be eligible with the Scheme as proposed. The assessment of qualification would be reconsidered when a final scheme design is approved and the qualifying properties identified and notified in accordance with the Regulations.

Airborne-Induced Vibration

11.6.89 The results of the airborne-induced vibration assessment are given in Table 11.32. It can be seen that no properties would experience increases in vibration nuisance in the DM scenario (2010 v 2025). With the implementation of the Scheme, 798 properties would experience an increase in vibration nuisance.

Table 10.32 Vibration nuisance assessment in the Design Year v Opening Year 2010 (DS 2025 v DM 2025)

All Ambient Bands		Residential	
		Scheme	**Do Minimum**
Increase in Nuisance Level	0 TO <10%	392	0
	10% TO <20%	365	0
	20% TO<30%	9	0
	30% TO <40%	32	0
	>=40%	0	0
Decrease in Nuisance Level	0 TO <10%	0	0
	10% TO <20%	0	0
	20% TO<30%	0	0
	30% TO <40%	0	0
	>=40%	0	0

11.7 Conclusions

11.7.1 The Scheme would connect a busy, traffic light controlled crossroads adjacent to Bexhill town centre to the main access, to the commercial area, to the north of Hastings. In doing so it would pass along an existing, abandoned railway cutting at the southern end and across an area of open countryside before the junction with The Queensway.

11.7.2 The Scheme would affect properties and open areas within several hundred metres of its alignment.

11.7.3 The southern junction, the approach to the railway cutting and the railway cutting itself are within a developed area that consists predominantly of residential properties that abut existing roads and currently receive high levels of traffic noise up to around 70dB $L_{A10,18hr}$.

11.7.4 Further along the route many of the dwellings have rear façades overlooking the railway cutting. Properties to the east of the cutting have front façades facing the London Road and receive traffic noise of around 69dB $L_{A10,18hr}$ from that source but have the benefit of there being no direct traffic noise source to their western, rear façades. Existing traffic noise levels at

these façades are around 49dB $L_{A10,18hr}$. The Scheme would increase traffic noise levels at these properties to up to 68dB $L_{A10,18hr}$.

11.7.5 Properties immediately to the north of the Ninfield Road Bridge, that do not have a significant source of traffic noise in the existing situation, would receive traffic noise levels of up to 70dB $L_{A10,18hr}$. Where the route passes through the countryside and where noise levels are not currently dominated by traffic noise, it would introduce a new traffic noise source giving rise to noise levels, close to the proposed alignment, of around 55dB $L_{A10,18hr}$, which in some instances equates to a major increase in traffic noise level. The increase in traffic noise level in the rural areas has been limited by the design aim of limiting the level on the Greenway to 55dB $L_{A10,18hr}$. As a result of this work immediate traffic noise level increases due to the Scheme through the rural section would only affect an area up to approximately 1000 metres from the new road. Beyond this distance traffic noise level changes would be minimal to indiscernible.

11.7.6 In the wider area which would be affected by traffic flow changes as a result of the Scheme, some existing roads, the A259 Coast Road, Hooe Road and Harley Shute Road for example, would benefit from a reduction in traffic growth over that which would be expected without the Scheme. Other roads, The Ridge and Queensway for example, would receive an increase in traffic noise as a result of the Scheme.

11.7.7 In total, with the Scheme, 7,310 properties are expected to receive an increase in traffic noise of at least 1dB $L_{A10,\ 18\ hr}$, and an increase in nuisance of at least 10%. 59 of these would receive a Major increase of 15dB $L_{A10,\ 18\ hr}$ or more. Without the Scheme, 3,067 are predicted to receive a traffic noise increase of between 1 and 5dB due to traffic growth.

11.7.8 1,740 properties are expected to benefit from a minimal to slight reduction in traffic noise of between 1 and 5dB $L_{A10,18hr}$ and to benefit from an up to 10% reduction in noise nuisance as a result of the Scheme.

11.7.9 Overall 4,243 more residential properties would receive a minimal increase or greater in traffic noise than would do so without the Scheme. However, 1,655 more properties would receive a minimal or greater decrease in traffic noise with the Scheme than would do so without the Scheme.

11.7.10 Construction noise is expected to affect 29 properties close to the works at or above the criteria detailed in Table 11.3. No properties are expected to be subject to levels of construction vibration at or above the criteria described in this chapter (see also Table 11.4).

11.7.11 Therefore, based on the numbers of properties potentially affected by the Scheme and the levels of traffic noise which would affect them the overall effect of the Scheme would be moderately adverse.

11.7.12 Under the provisions of the Noise Insulation Regulations a preliminary assessment would suggest that 18 properties may qualify for noise insulation work as a result of the Scheme. This would be confirmed and the affected

properties identified when Planning Consent has been granted and the detailed design of the Scheme has been completed.