

**Carlyon Bay
Environmental
Statement (2011)**

Chapter I

Noise & Vibration

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I1.0 Introduction

- I1.1 Buro Happold has been appointed to carry out a noise and vibration impact assessment for the proposed development at Carlyon Bay, near St Austell, Cornwall.
- I1.2 This chapter describes the effects that development will have on the environmental noise and vibration conditions in the area of the proposed development.
- I1.3 The effects during the construction phase and the longer term post development effects (referred to as after completion) are considered separately.
- I1.4 The proposed scheme comprises sea defences, residential development and leisure facilities. Detailed proposals are being submitted for works to the sea defences, the promenade and to the Sandy River. Outline proposals are being made for the residential and leisure scheme.
- I1.5 Potential sources of noise are likely to arise from construction works including vehicular access to the site. Piling may have the ability to generate significant vibration levels.
- I1.6 Vibration effects after completion are unlikely to be significant.
- I1.7 Noise from the completed operational scheme is likely to include contributions from road traffic, building services, and activity noise from recreational and commercial facilities.
- I1.8 The nearest high sensitivity receptors are located to the west of the proposed site. These receptors include the Carlyon Bay Hotel and dwellings within the Carlyon residential estate.
- I1.9 This report presents the following information:-
- 1 Relevant standards and guidance documents
 - 2 Assessment methodologies and significance criteria
 - 3 Summarises the baseline conditions
 - 4 Assesses the potential effects
 - 5 Outlines mitigation measures where deemed necessary
 - 6 Outlines any remaining residual effects after mitigation
- I1.10 The majority of this report assesses the effects of the development proposals on the site in its current state. However a brief assessment is made in comparison to the extant scheme for the site that was granted planning permission in 1990 and renewed in 1996.

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12.0 Policy Context

Planning Policy Guidance 24: Planning and Noise (PPG24)

- 12.1 Planning Policy Guidance 24: Planning and Noise (PPG24) provides guidance to local authorities on the planning measures available to them to minimise the adverse impacts of noise. The document provides guidance for both noise sensitive developments and for developments that generate noise.
- 12.2 In assessing noise from construction sites, PPG24 (Annex 3, paragraph 21) refers to the guidance given in BS 5228 parts 1-4 and in particular, Part 1: 1984 *Code of practice for basic information and procedures for noise control*. BS 5228 has recently been updated and condensed into two documents BS 5228 parts 1 and 2:2009.
- 12.3 In assessing noise of an industrial nature, PPG24 (Annex 3, paragraph 19) refers to the method provided in BS 4142: 1990. This standard has been updated to BS 4142:1997.
- 12.4 In assessing noise from commercial developments, PPG24 (Annex 3, paragraph 20) suggests that noise from activities such as discos and night-clubs pose particular difficulties owing to the fact that the activities are often at their peak during the evening and late at night. The document suggests that noise within the premises and external noise generated by customers in the vicinity should both be considered.
- 12.5 In assessing noise from recreational and sporting activities, PPG24 (Annex 3, paragraph 22) discusses that it is important to take into account how frequently the noise will be generated and how disturbing it will be. It also states that the local planning authority may consider it reasonable to permit higher noise emission levels than they would from industrial development, subject to a limit on the hours of use, and the control of noise emissions (including public address systems) during unsocial hours.

Control of Pollution ACT 1974 (CoPA)

- 12.6 Legal powers to control construction noise are provided under the Control of Pollution Act 1974 (CoPA). The legislation introduces the concept of using Best Practicable Means (BPM) to minimise noise as defined in Section 72 of CoPA.

BS 5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise

- 12.7 BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise* provides guidance on noise generated by construction sites. The document is comprehensive, providing background information, methods of prediction, significance criteria and examples of mitigation measures. The standard is the accepted method of assessing noise due to construction sites.

BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration

- 12.8 BS 5228-2:2009 *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* provides guidance on vibration generated by construction sites. The document is comprehensive, providing background information, examples of mitigation measures, methods of prediction for a sample of activities and guidance significance criteria. The standard is the accepted method of assessing vibration due to construction sites.

BS 4142:1997 Method for Rating industrial noise affecting mixed residential and industrial areas

- 12.9 BS 4142:1997 *Method for Rating industrial noise affecting mixed residential and industrial areas* is the accepted method for assessing the likelihood of complaint from residents due to the introduction of an industrial noise source.
- 12.10 The standard is not normally used to assess noise due to construction or commercial activities.

BS 8233:1999 Sound insulation and noise reduction for buildings – Code of practice

- 12.11 BS 8233:1999 *Sound insulation and noise reduction for buildings – Code of practice* provides guidance on maximum internal noise levels due to anonymous noise. This standard is also referred to in PPG24. The guidance given is as follows:-

- | | |
|----------------|--|
| 1 Living rooms | 30 – 40 dB L_{Aeq} (Good – Reasonable) |
| 2 Bedrooms | 30 – 35 dB L_{Aeq} (Good – Reasonable) |

- 12.12 For a reasonable standard in bedrooms at night, BS 8233 also recommends that individual noise events (measured with F time weighting) should not normally exceed 45 dB L_{Amax} .
- 12.13 For external noise, BS 8233 recommends that noise levels in garden areas should not exceed 50 dB L_{Aeq} and 55 dB L_{Aeq} should be regarded as the upper limit.

World Health Organisation (WHO) Night Noise Guidelines for Europe

- 12.14 The WHO Night Noise Guidelines for Europe (published 2009) recommends an $L_{night, outside}$ night noise guideline (NNG) level of 40 dB. The document describes the NNG as:

A health-based limit value of the night noise guidelines (NNG) necessary to protect the public, including most of the vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise.

- 12.15 $L_{night, outside}$ is the free-field equivalent continuous noise level over the night-time period (23:00 to 07:00) incident on the façade of the dwelling or noise sensitive building.

12.16 The WHO states that the Night Noise Guidelines may be considered as an extension to, as well as an update of, the previous WHO Guidelines for community noise (1999).

Construction Noise Guidance

12.17 As stated in the Construction Methodology, appended to Chapter C of this environmental statement, the contractor will be required to produce and agree a Construction Environmental Management Plan (CEMP). The CEMP will describe how construction will be managed to avoid, minimise and mitigate any construction effects on:-

- 1 The environment
- 2 Existing surrounding communities
- 3 Residents of Carlyon Bay

12.18 The CEMP will be produced in accordance with the recommendations of PPG 6 which has been prepared by the Environment Agency and is entitled *Pollution Prevention Guidelines*.

12.19 The CEMP will provide the management framework needed for the planning and implementation of construction activities in accordance with environmental commitments identified within the Environmental Statement and any requirements of planning conditions or Section 106 legal agreements.

12.20 A detailed CEMP will be produced as part of the detailed submissions on reserved matters for the development phase. An Outline CEMP in the Construction Methodology section of this ES describes how the detailed CEMP will work, how it will be produced, how statutory authorities and other interested groups will be able to interact with the process, and how the control of construction aspects will be achieved.

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I3.0

Assessment Methodology & Significance Criteria

Assessment Methodology

Construction Noise

- I3.1 BS 5228-1:2009 presents a number of methods to assess whether construction noise at sensitive receptors is likely to lead to a significant effect.
- I3.2 The standard provides methods of assessment based on absolute noise levels as well as other methods based on a change in noise level before and after the introduction of construction.
- I3.3 In this particular case, due to the quiet nature of the site, it is recommended to use the criteria based upon the change in noise level. Table E.1 from BS 5228-1 illustrating the ABC method of determining the significance at dwellings is reproduced below. This method has been adopted to assess the construction noise aspects of the proposals.

Table I3.1 Reproduction of table E1 from BS 5228-1:2009 illustrating the ABC method of construction noise assessment

| Assessment category and threshold value period (L_{Aeq}) | Threshold value, in decibels (dB) | | |
|--|-----------------------------------|--------------------------|--------------------------|
| | Category A ^{A)} | Category B ^{B)} | Category C ^{C)} |
| Night-time (23.00-07.00) | 45 | 50 | 55 |
| Evenings and weekends ^{D)} | 55 | 60 | 65 |
| Daytime (07.00-19.00) and Saturdays (07.00-13.00) | 65 | 70 | 75 |
| <i>NOTE 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.</i> | | | |
| <i>NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.</i> | | | |
| <i>NOTE 3 Applies to residential receptors only.</i> | | | |
| ^{A)} Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. | | | |
| ^{B)} Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. | | | |
| ^{C)} Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. | | | |
| ^{D)} 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays. | | | |

13.4 The ABC method selects the appropriate category (A, B or C) based on the existing ambient noise levels during the appropriate time period. For example, if the daytime existing ambient noise level is less than 65 dB then Category A is selected, similarly, if the existing ambient noise level is greater than 65 dB then Category C is selected. The values given in the table under the appropriate category then provide a limit for the total noise levels (including construction) above which a significant effect is deemed to occur. If noise levels exceed the appropriate threshold then this an indication that mitigation measures are required.

13.5 BS 5228-1 states that in relation to the assessment of construction noise with the existing ambient noise:-

“it is generally assumed that a greater difference might be tolerated, than for an industrial source, when it is known that the operations are of short or limited duration, and the critical issues are likely to include interference with speech communication and/or sleep disturbance.”

Construction Vibration

13.6 Significance criteria for construction vibration derived from the advice given in BS 5228-2:2009 are presented in Table I3.3 below.

Road Traffic Noise

13.7 Road traffic noise levels for the operational scheme have been predicted using the standard methods described in the Department of Transport Calculation of Road Traffic Noise (CRTN).

13.8 In the absence of specific guidance on assessing changes in road traffic noise levels on existing noise sensitive receptors, the criteria presented in Table I3.2 below have been used as a basis of the assessment.

Building Services Noise

13.9 BS 4142:1997 is the accepted method for assessing noise of an industrial nature.

13.10 With the BS 4142 method, the measured or predicted equivalent continuous noise level, L_{Aeq} , from the industrial source is determined at the nearest dwellings. This is termed the specific noise level. If there are no distinguishable characteristics, then the rating level is equal to the specific level. If there are judged to be distinguishable characteristics (e.g. tonal, impulsive and / or irregular), then the rating level is deemed to be equal to the specific noise level plus 5 dB.

13.11 The BS 4142 assessment then compares the rating level against the existing background noise level measured as an L_{A90} .

13.12 Regarding rating levels in comparison with the background noise level, BS 4142 states the following:-

The greater the difference the greater the likelihood of complaints.

A difference of around +10 dB or more indicates that complaints are likely.

A difference of around +5 dB is of marginal significance.

If the rating level is more than 10 dB below the measured background noise level then this is a positive indication that complaints are unlikely.

- I3.13 It is important to note that BS 4142 states that the assessment method is not suitable when the background and rating noise levels are both very low. BS 4142 considers background noise levels below about 30 dB and rating levels below about 35 dB to be very low.
- I3.14 New commercial activities and sites included within the development can be expected to generate noise from plant and processes. For the majority of the development it is likely the sources of noise will be limited to building services plant (energy centre, general ventilation, heating and cooling). With some care in selection and location, and with noise levels limited (by means of attenuation, screening etc) in line with established guidance such as that in BS 4142, BS 8233 and the WHO guidelines, well installed and maintained equipment of this type would not be expected to lead to noise concerns.
- I3.15 Operational noise from new plant can be assessed on a compliance / non-compliance basis with reference to an assessment in accordance with BS 4142 and control through the planning process. Non-compliance will result in a high adverse impact, whereas compliance will result in a negligible impact. Design in accordance with planning provisions will ensure that there is negligible impact.

Mixed Sources

- I3.16 In the absence of specific published guidance, we recommend that noise levels due to commercial and recreational activities should be assessed based on the criteria presented in Table I3.2 below.

Significance Criteria

- I3.17 Based on the basic guidance given in the draft document *Guidelines for noise impact assessment* published by the Institute of Environmental Management and Assessment (IEMA) and the Institute of Acoustics (IOA), the following significance criteria are proposed for road traffic noise and mixed sources (commercial and recreational activities but excluding building services noise).

Table I3.2 Basic significance criteria for road traffic and mixed sources

| Significance | Change in noise level |
|------------------------|---------------------------------|
| Substantial beneficial | Reduction greater than 5 dB |
| Moderate beneficial | Reduction between 3 dB and 5 dB |
| Minor beneficial | Reduction between 1 dB and 3 dB |

| Significance | Change in noise level |
|----------------------|--------------------------------|
| Neutral / negligible | Within +/- 1 dB |
| Minor adverse | Increase between 1 dB and 3 dB |
| Moderate adverse | Increase between 3 dB and 5 dB |
| Substantial adverse | Increase greater than 5 dB |

I3.18 As discussed in the document however, it is important that other factors are also considered in determining the significance of a noise change. Such factors include, the duration of the noise, the time of day that it occurs, the nature of the noise, how frequently it operates, the spectral characteristics, how the noise level compares to guidance on absolute noise levels and which noise parameter is used. It is therefore not simply a case of using the above table to determine the impact based on a basic change in noise level.

Construction Noise

I3.19 For construction noise, the changes shown in Table I3.2 shall be considered in relation to the threshold levels given in Table I3.1 e.g. if the appropriate threshold level is exceeded by 3 dB this would indicate, subject to any of the additional factors discussed, that the increase due to construction noise was of minor adverse significance.

I3.20 It is worth noting that the significance criteria given in Table I3.2 also tie in well with the guidance given in the 5 dB(A) change method presented in BS 5228-1. This method suggests that an increase in the ambient noise level of 5 dB or more due to construction is significant.

Construction Vibration

I3.21 Based on the guidance given in BS 5228-2:2009, the following significance criteria have been derived. In accordance with the guidance given in the standard, the vibration levels are quoted in terms of the Peak Particle Velocity (PPV).

I3.22 The levels have been derived from the guidance given on human response to vibration. Cosmetic, minor and major damage to buildings requires considerably higher magnitudes of vibration than those which could lead to adverse comments due to human response. Vibration levels that are likely to cause damage to buildings would be considered to be of substantial adverse significance.

Table I3.3 Significance Criteria for construction vibration

| Significance | Vibration level |
|----------------------|------------------------------|
| Neutral / negligible | <0.3 mm.s ⁻¹ |
| Minor adverse | 0.3 – 1.0 mm.s ⁻¹ |
| Moderate adverse | 1.0 – 5.0 mm.s ⁻¹ |

| Significance | Vibration level |
|---------------------|-------------------------|
| Substantial adverse | >5.0 mm.s ⁻¹ |

Road Traffic Noise

- 13.23 The significance of the predicted road traffic noise levels when compared to the existing ambient noise levels is made with reference to the criteria presented in Table I3.2.

Building Services Noise

- 13.24 For industrial noise, and with reference to the established methods provided in BS 4142, the following specific significance criteria are proposed:-

Table I3.4 Significance criteria for industrial noise

| Significance | Rating level relative to the background (LA90) noise level |
|----------------------|--|
| Neutral / negligible | 10 dB below |
| Minor adverse | Equal |
| Moderate adverse | 5 dB above |
| Substantial adverse | 10 dB above |

- 13.25 It should be noted that beneficial effects are only possible if the scheme calls for the change or removal of an industrial noise source. As this is not called for within the proposed development, beneficial effects in relation to industrial noise are not considered possible.

Mixed Sources

- 13.26 The significance of commercial and recreational activity noise levels when compared to the existing ambient noise levels shall be made with reference to the criteria presented in Table I3.2.

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14.0 Baseline Conditions

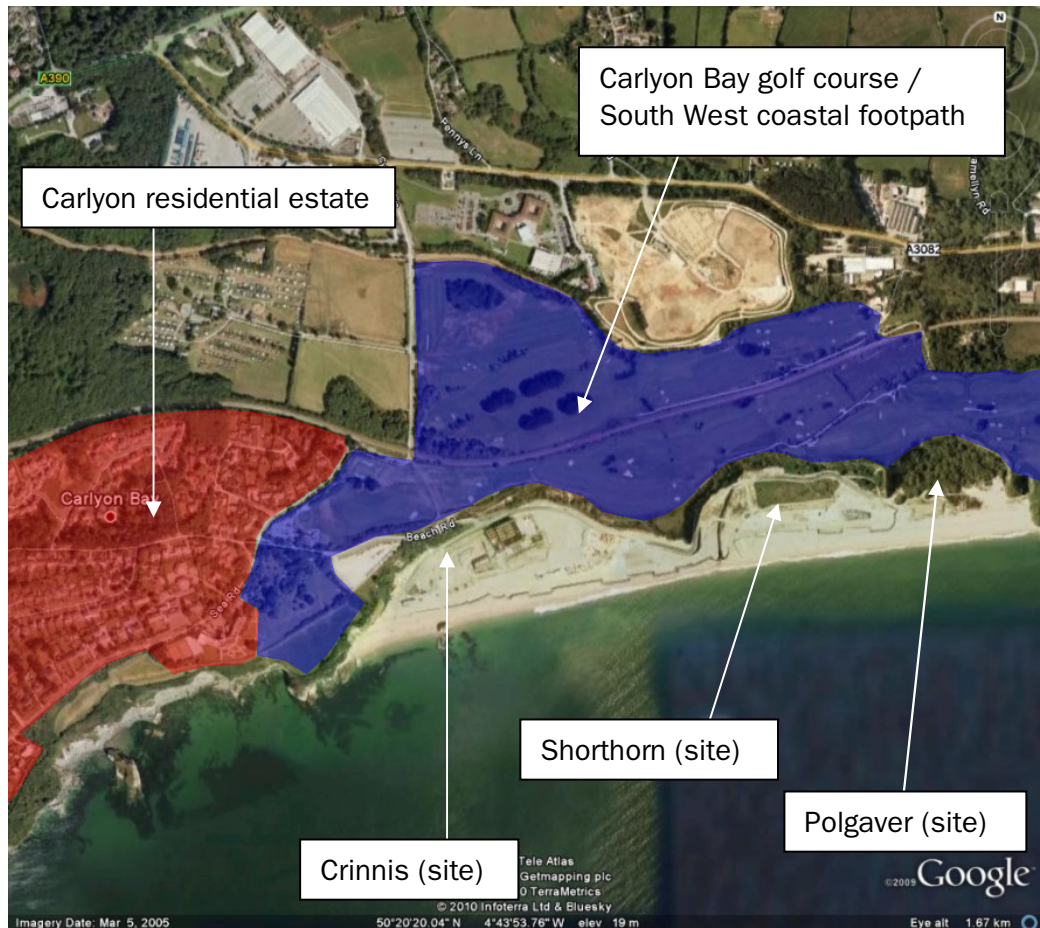
14.1 Pre-development baseline conditions for environmental noise were evaluated by means of an acoustic survey, with measurement of sound levels at locations around the area potentially affected by development impacts.

14.2 Baseline road traffic flows for the area have also been provided by the design team and are presented.

Location

14.3 The figure below shows the areas of the Carlyon residential estate, the Carlyon Bay golf course / South West coastal path abutting the site and the three areas comprising the majority of the site.

Figure 14.1 Areas of residential and the Carlyon Bay golf course



Noise Survey Methodology

- 14.4 A noise survey was carried out on and around the proposed site from Thursday 05 August 2010 until Friday 06 August 2010.
- 14.5 The purpose of the measurements was to establish the existing baseline noise levels around the site prior to any development. Short-term sample noise measurements were undertaken at a number of measurement positions.
- 14.6 Full details of the noise survey can be found in our Noise Survey report contained within Appendix I1. Measurement positions used during the survey are shown in Figure I4.2 and are described below in Table I4.1.

Figure I4.2 Aerial view of part of the site showing measurement positions

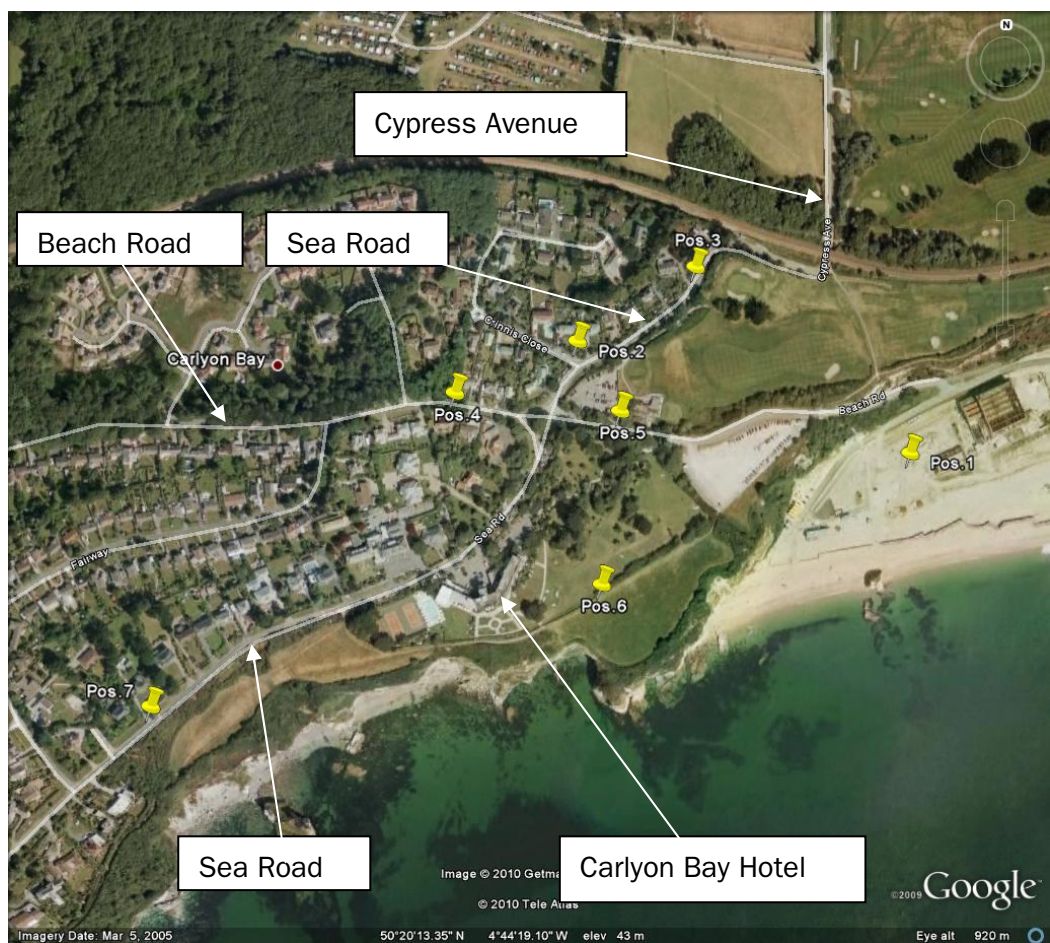


Table I4.1 Measurement positions

| Position | Description |
|----------|--|
| 1 | On the site. Free-field conditions. |
| 2 | Outside Casa Nostra on Crinnis Close. Approximately 13 m to the near side edge of Sea Road. Free-field conditions. |
| 3 | Outside Seaview Bungalow on Sea Road. Approximately 1.5 m to the near side edge of Sea Road. Free-field conditions. |
| 4 | Outside 90 Beach Road. Approximately 4 m to the near side edge of Beach Road. Façade conditions. |
| 5 | Outside Carlyon Bay golf club house. Approximately 1.5 m to the near side edge of Beach Road. Free-field conditions. |
| 6 | In the public grounds to the southeast of the Carlyon Bay Hotel. Free-field conditions. |
| 7 | Outside no. 69 Sea Road (Belvedere House). Approximately 1.5 m to the near side edge of Sea Road. Free-field conditions. |

Noise Measurement Results

I4.7 A summary of the noise measurement results is given below. Full detailed results can be found in Appendix I1.

Table I4.2 Summary of noise measurement results

| Position | Daytime $L_{Aeq,10min}$ (dB) | Daytime $L_{A90,10mins}$ (dB) | Evening $L_{Aeq,10min}$ (dB) | Night-time $L_{A90,5min}$ (dB) |
|----------|------------------------------|-------------------------------|------------------------------|--------------------------------|
| 1 | 42 | 37 | 40 | 29 |
| 2 | 55 | 40 | 51 | 26 |
| 3 | 57 | 38 | 52 | 21 |
| 4 | 59 | 41 | 55 | 23 |
| 5 | 59 | 43 | 52 | 27 |
| 6 | 54 | 40 | 36 | 26 |
| 7 | 53 | 39 | 48 | 21 |

Baseline Traffic Flows

I4.8 The following table shows the road traffic flows for three baseline scenarios:

- 1 2009 do nothing
- 2 2016 do nothing
- 3 2016 with the extant scheme

I4.9 Flows for the scheme have been derived from the data provided by the design team and are presented below as 18 hour (06:00 – 24:00) traffic flows. The 18 hour flows are based on the annual average daily traffic (AADT) combined vehicles/day and a ratio correction from 24-hour to 18-hour traffic flows of

1.019. The raw traffic flow data received from the design team is presented in Appendix I2.

Table I4.3 Baseline traffic flows

| Street Name | Vehicles/18 hour (06:00 – 24:00) | | |
|---|----------------------------------|-----------------|---------------------------------|
| | 2009 Do Nothing | 2016 Do Nothing | 2016 Do Something Extant scheme |
| Access Road | 699 | 795 | 2293 |
| Sea Road (Between Beach Road & Cypress Avenue) | 1891 | 2151 | 3050 |
| Cypress Avenue | 2013 | 2289 | 3188 |
| A3082 Par Moor Road (Between Cypress Avenue & A390 Holmbush Road) | 10513 | 12093 | 12918 |
| A390 Holmbush Road (Between Par Moor Road & A391) | 24014 | 27668 | 28268 |
| A391 (Between A390 and Trenowah Road) | 9293 | 10639 | 11238 |
| Beach Road (Between junctions with Sea Road) | 3190 | 3629 | 4229 |
| Sea Road (Between Sea Road and The Cedars) | 879 | 1000 | 1000 |
| Crinnis Road | 3682 | 4188 | 4788 |
| Holmbush Arch Road | 3079 | 3534 | 3564 |
| Church Road | 3529 | 4015 | 4584 |
| Charlestown Road (Between Church Road & A390) | 4818 | 5482 | 6051 |
| A390 (Between Charlestown Road and Porthpean Road) | 22752 | 25954 | 26374 |

15.0 Potential Effects

Introduction

15.1 This section of the report describes the anticipated noise and vibration impacts of the proposed development during construction and after completion.

During Construction

15.2 Construction of the Carlyon Bay development is proposed to be carried out over a period of 42 months. An outline Construction Methodology is appended to Chapter C of this environmental statement and provides sufficient information at this stage to identify potential effects. Typical equipment including piling rigs, crushers, dozers, rock armour grab machinery and concrete batching plant will be used.

Construction Noise

15.3 The following table shows the approximate minimum distances to the nearest noise sensitive receptors from the closest areas of Crinnis (the closest section of the site). These worst-case distances have been used in the subsequent assessment of construction noise. The receptor noise sensitivities are also categorised.

Table I5.1 Assumed source to receiver distances

| Receptor | Minimum distance (m) | Receptor sensitivity |
|--|----------------------|----------------------|
| Nearest dwelling on Sea Road | 230 | High |
| Carlyon Bay Hotel | 250 | High |
| Carlyon Bay golf clubhouse | 160 | Low |
| Carlyon Bay golf course / coastal path | 50 | Moderate |

15.4 Tabulated below are predictions of construction noise to the nearest noise sensitive receptors.

Table I5.2 Predicted construction noise levels

| Activity / Equipment | Activity L_{Aeq} at 10 m (dB) | Predicted L_{Aeq} at receptor location (dB) | | | |
|---|---------------------------------|---|-------------------|----------------------------|-------------------------|
| | | Nearest dwelling on Sea Road | Carlyon Bay Hotel | Carlyon Bay Golf Clubhouse | Carlyon Bay golf course |
| Pre-cast concrete piling – hydraulic hammer | 89 | 55 | 54 | 58 | 65 |
| Dozer carrying out ground excavation/earthworks | 80 | 46 | 45 | 49 | 56 |

| Activity / Equipment | Activity L _{Aeq} at 10 m (dB) | Predicted L _{Aeq} at receptor location (dB) | | | |
|---|---|--|-------------------------|----------------------------------|-------------------------------|
| | | Nearest dwelling on Sea Road | Carlyon Bay Hotel | Carlyon Bay Golf Clubhouse | Carlyon Bay golf course |
| Tracked excavator carrying out ground excavation/earthworks | 79 | 45 | 44 | 48 | 55 |
| Dump truck tipping fill | 79 | 45 | 44 | 48 | 55 |
| Concrete batching plant | 75 (based on typical data for such plant items) | 41 | 40 | 44 | 51 |
| Tracked crusher | 84 | 50 | 49 | 53 | 60 |
| Truck mounted concrete pump + boom arm | 80 | 46 | 45 | 49 | 56 |
| Poker vibrator | 78 | 44 | 43 | 47 | 54 |
| Water pump | 65 | 31 | 30 | 34 | 41 |

- 15.5 The above predictions are based on worst-case sound level data given in BS 5228-1 and assume hemispherical propagation from the source, a 10 dB reduction for screening (the receptors are all completely visually screened from the nearest source locations due to the ground topography) and a +3 dB correction for reflections at facades (with the exception of predictions to the golf course). The predictions do not consider attenuation due to ground effects or meteorological effects.
- 15.6 The above predictions assume that the plant / activities would be fully operational for the duration of the time period in question e.g. the full 10-hour daytime period. In reality, the listed activities would not operate continuously for such a length of time and therefore the noise levels are likely to be lower, for example if they were to operate for half this time then noise levels would be 3 dB lower.
- 15.7 The timing of construction activities are indicated in the Outline CEMP. These are, in the main, normal construction hours, 6 days/week. However the parts of the construction of the sea defences will require the Contractor to work with the tides which will be outside of these hours. Details of these activities will be included in the Detailed CEMP.
- 15.8 An assessment of the daytime construction noise activities predicted is given below:-

Table I5.3 Construction noise assessment

| Receptor | Existing daytime ambient noise level, L_{Aeq} (dB) | BS 5228-1 ABC Category | Daytime threshold value L_{Aeq} (dB) | Predicted worst-case noise level L_{Aeq} (dB) | Significance |
|------------------------------|--|------------------------|--|---|-----------------------|
| Nearest dwelling on Sea Road | 57 | A | 65 | 55 | Neutral / negligible |
| Carlyon Bay Hotel | 54 | A | 65 | 54 | Neutral / negligible |
| Carlyon Bay golf clubhouse | 59 | A* | 65 | 58 | Neutral / negligible* |
| Carlyon Bay golf course | 42 (based on measurements taken at Pos.1) | A* | 65 | 65 | Neutral / negligible* |

* The BS 5228-1 ABC assessment method is applicable to residential receptors only. The categories given for both the golf clubhouse and golf course are for guidance only based on dwelling sensitivity. For moderate and low noise sensitive receptors a relaxation of 5 dB and 10 dB respectively in the category threshold values is considered appropriate. It should be highlighted however that the predicted noise levels in these instances meet the more onerous level required for dwellings.

- 15.9 Some of the more distant parts of proposed development site have line of sight to noise sensitive receptors. The closest of these noise sensitive receptors is the Carlyon Bay Hotel. It is estimated that the minimum distance from the hotel to the sections of the site that are visible (i.e. unscreened) is of the order of approximately 700 m. Distance attenuations will accordingly be large and the potential effects from this area on this receptor are considered to be negligible.
- 15.10 In practice, the noise levels generated will be dependent on the specific plant selections, the number of operating plant items, length of operations, working practices and site layout adopted by a contractor. The above estimated values provide a high-level view suitable for understanding the magnitude of potential for noise disturbance and for setting a control and mitigation strategy. Detailed mitigation will be designed to ensure that agreed daytime values are met. The assessment of individual work proposals should form a part of the ongoing development of the construction proposals.
- 15.11 The following conclusions can be drawn from the assessment:-
- 1 Piling is likely to generate the highest noise levels although the effect is considered to be negligible
 - 2 At all assessment locations, impacts from the works are likely to be negligible.

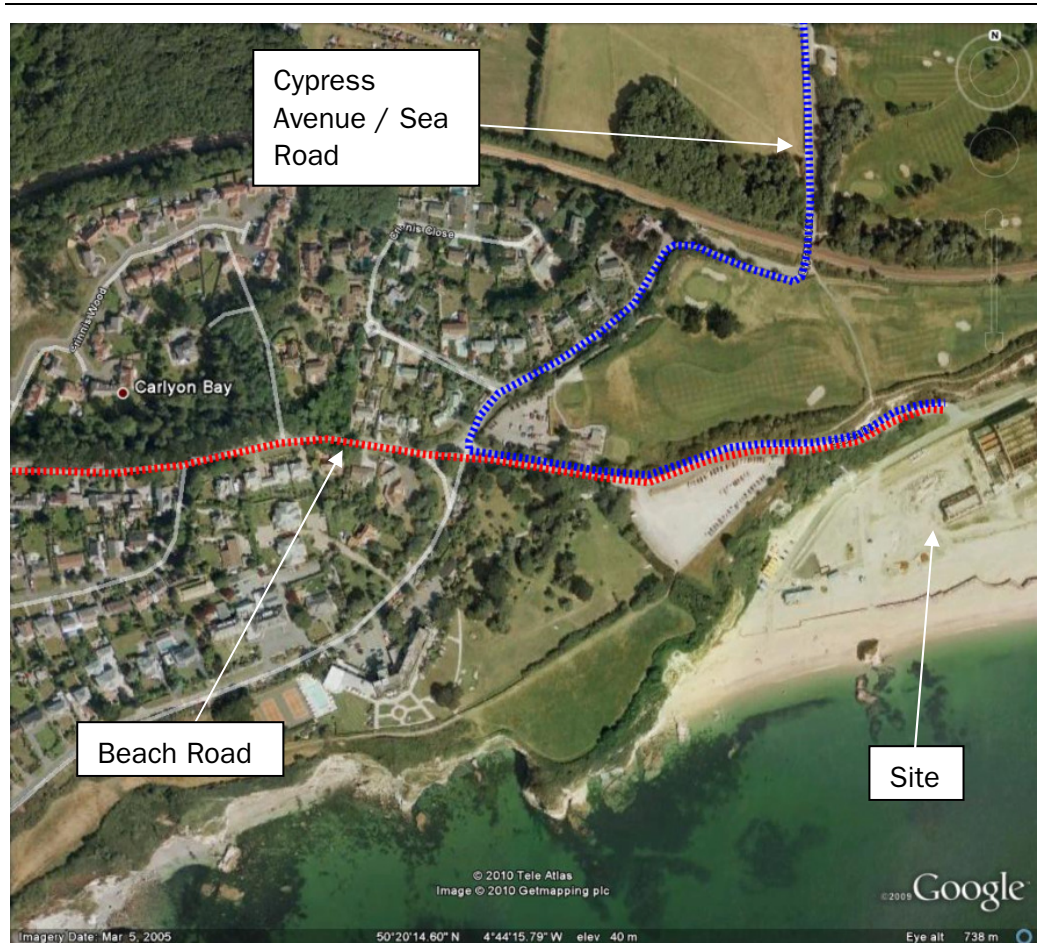
Construction Vibration

- 15.12 The risk of disturbance from vibration will depend to a high degree on the choice of piling method. Percussive piling can generate high levels of groundborne vibration. Rotary piling typically creates very little vibration and is unlikely to be of concern due to the distances involved to the nearby sensitive buildings.
- 15.13 The choice of rotary or percussive piling will include consideration of ground engineering and environmental considerations. Other construction activities are unlikely to create significant levels of vibration.
- 15.14 Piling is likely to take place during initial enabling works, demolition and site clearance works, and earthworks / sub-structure works. Further information can be found in the Construction Methodology appended to Chapter C of this environmental statement.

Construction Related Road Traffic

- 15.15 At this stage, information on traffic flows due to construction related traffic is not available. However, the Construction Methodology provides sufficient information to identify potential effects in outline. The majority of vehicles will access the site from Cypress Avenue / Sea Road. The CEMP will require those vehicles which can negotiate Cypress Avenue / Sea Road to use this route. Other vehicles over 20 tonnes and articulated vehicles will use Beach Road. Thus the vast majority of vehicles will be using the Cypress Avenue route. This will be implemented by way of a contractual condition of all contractors working on the Carlyon Bay Site. Both these routes are highlighted below.

Figure 15.1 Construction traffic access routes



- 15.16 Increases in traffic flows due to construction vehicles will be of a temporary nature and are unlikely to significantly increase road traffic noise levels. As an illustration of this, traffic flows would have to double for noise levels to increase by 3 dB – a moderate adverse impact. This would require construction related traffic flows alone to be of the magnitude of 2000 – 3000 veh/18-hour daytime period. Whilst detailed construction flows are not available due to the outline nature of much of this application and because a Contractor has not been appointed, a ‘pessimistic’ estimation of construction traffic flows has been carried out. This indicates that at peak the maximum flow of vehicles likely to be achieved is of the order of 300 vehicles per 18 hour daytime period. With CEMP measures in place the figure will reduce.
- 15.17 Traffic calming measures (speed tables) are present on both Sea Road and Beach Road. Speed tables have the potential to cause unladen heavy goods vehicles to bounce and rattle (body slap) as the vehicles pass over them, creating additional impact noise. As part of the CEMP, construction vehicles will not be permitted to access the site during night-time hours, this will minimise the potential for sleep disturbance due to maximum noise levels.

Extant Scheme

- 15.18 By way of comparison, the construction methods envisaged for the proposed development are unlikely to be significantly different to those proposed for the extant scheme (both adopting the best practicable means) and therefore the impact is considered to be neutral / negligible.

After Completion

Road Traffic

- 15.19 Flows for the scheme used in the assessment have been derived from the data provided by the design team. The principal design cases considered are:-
- 1 2016 do nothing
 - 2 2016 do something – proposed scheme
- 15.20 Road traffic noise predictions have been carried out using the methodology described in the Calculation of Road Traffic Noise (CRTN). The predictions are based on the annual average daily traffic (AADT) combined vehicles/day and a ratio correction from 24-hour to 18-hour traffic flows of 1.019. The predictions take into account traffic flow changes including the change in the percentage of heavy goods vehicles.
- 15.21 The anticipated percentage increases in traffic comparing the 2016 do something – proposed scheme with the 2016 do nothing scenario, together with the predicted increase in noise level and associated significances are set out in Table 15.4 below:-

Table 15.4 Road traffic flow percentage increases and predicted noise changes

| Street Name | Increase in road traffic (%) | Noise increase (dB) | Significance |
|---|------------------------------|---------------------|----------------------|
| Access Road | 193 | N/A* | See below* |
| Sea Road (Between Beach Road & Cypress Avenue) | 39 | 1.8 | Minor adverse |
| Cypress Avenue | 36 | 1.7 | Minor adverse |
| A3082 Par Moor Road (Between Cypress Avenue & A390 Holmbush Road) | 6 | 0.3 | Neutral / negligible |
| A390 Holmbush Road (Between Par Moor Road & A391) | 2 | 0.1 | Neutral / negligible |
| A391 (Between A390 and Trenowah Road) | 5 | 0.2 | Neutral / negligible |
| Beach Road (Between junctions with Sea Road) | 19 | 0.8 | Neutral / negligible |
| Sea Road (Between Sea Road and The | 0 | 0.0 | Neutral / |

| Street Name | Increase in road traffic (%) | Noise increase (dB) | Significance |
|--|------------------------------|---------------------|----------------------|
| Cedars) | | | negligible |
| Crinnis Road | 15 | 0.6 | Neutral / negligible |
| Holmbush Arch Road | 1 | 0.0 | Neutral / negligible |
| Church Road | 15 | 0.6 | Neutral / negligible |
| Charlestown Road (Between Church Road & A390) | 11 | 0.4 | Neutral / negligible |
| A390 (Between Charlestown Road and Porthpean Road) | 2 | 0.1 | Neutral / negligible |

* Access Road exhibits too low traffic flows (below 1000 veh/18-hour) in the 2016 do nothing scenario for valid noise level predictions to be made. The percentage increase in traffic on the road however would indicate that the impact would be of moderate adverse significance. However, there are no high sensitivity receptors on this road and therefore the significance is considered to be **minor** adverse.

- 15.22 The remaining results show neutral / negligible impacts at all receptors with the exception of Sea Road (Between Beach Road & Cypress Avenue) and Cypress Avenue which show minor adverse impacts.

Building Services / Mixed Sources

- 15.23 As discussed in I3.14, building services noise from the proposed development will need to be designed and specified to ensure planning conditions relating to existing noise sensitive receptors are met, thereby ensuring negligible impact. Recognition will also need to be given to ensuring noise levels affecting the proposed development are adequate to provide good amenity.
- 15.24 Commercial and recreational activity noise should be designed to ensure that the existing ambient noise levels are not significantly increased thereby ensuring negligible impact.

Extant Scheme

- 15.25 For road traffic noise, based on the predicted traffic flows, at all assessment locations the assessment of the proposed scheme compared to the extant scheme shows neutral / negligible impacts.
- 15.26 Noise due to building services and mixed sources in both schemes will need to comply with standard guidance and planning conditions. Provided these are satisfied there will be a neutral / negligible impact of the proposed development compared to the extant scheme.

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16.0 Mitigation Measures

Introduction

16.1 Construction methods and detailed design will be subject to compliance with the CEMP (see I2.17).

During Construction

16.2 Construction methods and detail design will be subject to compliance with the CEMP as described in paragraph I2.17.

16.3 Specifications for construction work will include requirements to control noise and vibration in line with agreed limit values by measures such as:-

- 1 Code of Construction Practice
- 2 Use of S61 Agreements
- 3 Pollution Prevention Guidelines (particularly PPG 6) produced by the Environment Agency
- 4 Adherence to BS 5228 best practice guidance

16.4 Implementation on site will include mitigation measures such as the use of noise control at source and control on work times. This will ensure that the noise and vibration levels generated are kept to the minimum possible values consistent with safe and effective working.

16.5 Site construction hours are indicated in the Outline CEMP in the Construction Methodology section of this ES.

16.6 It is recommended that the daytime noise levels presented in Table I3.1, namely 65 dB $L_{Aeq,T}$, should be considered a target at the site boundary, although higher noise levels of up to 70 dB $L_{Aeq,T}$ should be permitted if the required construction activities demand this.

16.7 As part of the CEMP, construction vehicles will not be permitted to access the site during night-time hours.

16.8 Inter alia, the CEMP will also cover the following:-

- 1 A description of the work to be undertaken
- 2 A detailed programme of the construction activities
- 3 Proposed dates and sequence of the works
- 4 Details of proposed normal working hours and intended start up and close down times
- 5 Outline of any works which may require construction activities outside of normal working hours

- 6 Equipment and plant to be used (including type, make and expected number)
- 7 Vehicular access routes/points:
Location plan of each access route/point
List of activities for which each access point is to be used
- 8 Method of delivery / removal of materials and plant
- 9 Details of proposed site accommodation
- 10 Construction travel plans, including proposals for shared travel, car parking restrictions, use of public transport and use of off site vehicle holding area

After Completion

Road Traffic Noise

- 16.9 No mitigation measures are required as the predicted impacts are either neutral / negligible or minor adverse.

Building Services / Mixed Sources

- 16.10 Noise mitigation measures may be required to ensure planning conditions are met.
- 16.11 Achieving satisfactory noise levels for the proposed dwellings on-site will be the most stringent requirement and therefore noise levels at existing off-site receptors are unlikely to be adversely affected.
- 16.12 Measures to mitigate building services noise associated with the proposed development may include:-
- 1 Selection of quiet operating plant
 - 2 Locating plant equipment away from noise sensitive receptors
 - 3 Mitigation of plant noise levels by acoustic attenuators, screens, louvers, enclosures etc.
- 16.13 Methods to mitigate mixed sources (commercial and recreational activity noise) may include:-
- 1 Locating noise producing areas / activities away from sensitive receptors
 - 2 Enclosure of noise producing areas / activities
 - 3 Operating time restrictions.

17.0 Residual Effects

Introduction

17.1 This section describes the residual effects that are likely to be remaining after mitigation.

During Construction

17.2 Mitigation of construction noise and vibration as described in section 16.2 - should ensure that there are no significant adverse impacts and no residual effects are envisaged.

After Completion

17.3 Mitigation of road traffic noise is not required as the predicted impacts are neutral / negligible or of minor adverse significance. No significant residual effects are therefore envisaged.

17.4 Planning conditions will be met for noise due to building services and mixed sources and therefore no significant residual effects after completion are envisaged.

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18.0 Summary & Conclusions

18.1 A noise and vibration impact assessment has been carried out with regards to proposed development at Carlyon Bay.

18.2 The potential effects of the development have been assessed against two baseline conditions:-

- 1 The site in its undeveloped state
- 2 The site based on the extant scheme that was originally granted planning permission in 1990 and renewed in 1996.

18.3 Baseline conditions have been established by means of a noise survey and use of road traffic flows.

During Construction

18.4 At all assessment locations, noise impacts from construction works on the site are considered to be negligible. The contractor will be required to produce and agree a Construction Environmental Management Plan (CEMP). The CEMP will describe how construction will be managed to avoid, minimise and mitigate any construction effects on:-

- 1 The environment
- 2 Existing surrounding communities
- 3 Residents of Carlyon Bay

18.5 Specifications for construction work will include requirements to control noise and vibration in line with agreed limit values by measures including:-

- 1 Code of Construction Practice
- 2 Use of S61 Agreements
- 3 Pollution Prevention Guidelines (particularly PPG 6) produced by the Environment Agency
- 4 Adherence to BS 5228 best practice guidance

18.6 As part of the CEMP, construction vehicles will not be permitted to access the site during night-time hours.

18.7 It is recommended that the daytime noise levels presented in Table I3.1, namely 65 dB $L_{Aeq,T}$, should be considered a target at the site boundary, although higher noise levels of up to 70 dB $L_{Aeq,T}$ should be permitted if the required construction activities demand this.

18.8 Mitigation through the above measures will ensure there are no significant residual effects due to construction.

After Completion

- 18.9 The predicted impacts due to road traffic noise after completion are of minor adverse or neutral / negligible significance. Mitigation is therefore not required and no significant residual effects are envisaged.
- 18.10 Mixed noise sources from the development will be required to comply with planning conditions. Outline mitigation measures have been described and no residual effects are envisaged.

19.0

Abbreviations

| | | |
|----|-------|--|
| 1 | AADT | Annual Average Daily Traffic |
| 2 | BPM | Best Practicable Means |
| 3 | BS | British Standard |
| 4 | CEMP | Construction Environmental Management Plan |
| 5 | CoPA | Control of Pollution Act 1974 |
| 6 | CRTN | Calculation of Road Traffic Noise |
| 7 | IEMA | Institute of Environmental Management and Assessment |
| 8 | IOA | Institute of Acoustics |
| 9 | NNG | Night Noise Guideline |
| 10 | PPG24 | Planning Policy Guidance 24: Planning and Noise |
| 11 | PPV | Peak Particle Velocity |
| 12 | WHO | World Health Organisation |

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References

- 1 British Standards Institution, 1997. *BS 4142:1997 Method for Rating industrial noise affecting mixed residential and industrial areas*
- 2 British Standards Institution, 1999. *BS 8233:1999 Sound insulation and noise reduction for buildings – Code of practice*
- 3 British Standards Institution, 2009. *BS 5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.*
- 4 British Standards Institution, 2009. *BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*
- 5 *Control of Pollution Act 1974*. London: HMSO
- 6 Department for Communities and Local Government, 1994. *Planning Policy Guidance 24: Planning and Noise*. London: HMSO
- 7 Department of Transport Welsh Office, 1988. *Calculation of Road Traffic Noise*. London: HMSO
- 8 Institute of Environmental Management and Assessment and Institute of Acoustics, 2002. *Guidelines for noise impact assessment – Consultation Draft*.
- 9 World Health Organisation, 2009. *Night Noise Guidelines for Europe*. Copenhagen.