

**A Social Survey Questionnaire of Human Responses to
Vibration in Residential Buildings**

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A social survey questionnaire of human responses to vibration in residential buildings

by

H.V.C. Howarth and M.J. Griffin

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Authorised for issue by
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Summary

The development, structure, and content of a social survey questionnaire designed to determine human responses to vibration in residential environments are presented. The overall aim of the questionnaire was to obtain responses that could be combined with vibration measurements so as to investigate dose-response relationships for vibration in residential buildings. The questionnaire seeks to obtain information on how the vibration is perceived in residential environments and encompasses common sources of vibration outside the control of residents (e.g., from road, rail, industrial, construction operations). Methods of analysing responses obtained with the questionnaire are summarised.

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1. Introduction

Vibration produced by road and rail traffic, industrial machinery and construction activities can be transmitted through the ground to nearby buildings. Building vibration can also be caused by sources within buildings such as domestic equipment and footfalls, and from acoustic excitation, such as the sounds of aircraft or road traffic.

Responses to building vibration can include mild dissatisfaction or annoyance or anxiety, depending on the characteristics of the vibration and individual factors such as expectation, experience, and personal traits.

Residents may perceive building vibration by feeling the motion transmitted to them from a supporting surface, such as the floor or a chair. Vibration of a building may also be perceived by seeing movement, such as the swaying of pendulum lights, or hearing movement, such as the rattling of objects. The vibration of floors and walls may also radiate noise that can be heard. The reactions of residents to vibration in a building may therefore be complex due to the multiplicity of means of perceiving the vibration. Furthermore, responses to vibration can be increased or decreased by the presence of simultaneous noise, depending on the relative magnitudes of the two stimuli (Howarth and Griffin, 1990). When interviewed, residents may be uncertain of the differences between noise and vibration. A questionnaire designed to reveal causes of subjective responses to vibration in buildings should minimise unreliability in the interpretations of terminology and the means of perceiving vibration.

This report provides an overview of the development and structure of a social survey questionnaire designed to obtain responses from the occupants of buildings. It was envisaged that the questionnaire would be combined with vibration measurements so as to determine dose-response relationships for human responses to vibration in residential buildings. The various means of perceiving vibration, alternative response terminologies and ratings scales, the effect of questionnaire filters, and the order of questions are examined. The designs of previous questionnaires employed in social surveys of the responses of residents to vibration and noise are considered.

The questionnaire is designed to be delivered by face-to-face interview with people living close to a wide range of sources of vibration. One section of the questionnaire focuses on railways or construction sites and may be adapted for other specific sites. As presented, the interview duration is approximately 45 minutes. The questionnaire can be shortened for specific sites by removing, or shortening, questions on vibration from specific sources that are not relevant. The questionnaire and associated show cards are included in Appendices 1 and 2. The questionnaire is a revised version of a questionnaire developed by Howarth and

Griffin for the Department of Environment, Food and Rural Affairs (Contract NANR172 Human Response to Vibration in Residential Environments) in 2006.

2. Response terminology, ratings scales, filters and order of questions

2.1 Response terms

Vibration can provoke a range of reactions in residents, depending on various factors including the activities being conducted at the time of the vibration event. Those sleeping may be woken by vibration. Others may be annoyed by the same vibration if it distracts them from tasks such as reading or watching television. Questions designed to gather information on the reactions of residents to building vibration must include response terms that most appropriately describe the range of possible responses to the various types and effects of vibration.

Previous noise and vibration questionnaires have used combinations of the terms “bother”, “annoyance” or “disturbance”. Klæboe *et al.* (2003) proposed the use of “annoyance” scales with a lower anchoring point “Do not notice” in surveys of responses to road and rail traffic. Grimwood *et al.* (2002) asked residents to indicate whether they were “bothered, annoyed or disturbed” in a survey of community response to environmental noise. Stansfeld *et al.* (2000) asked respondents to indicate how “bothered, annoyed or disturbed” they were by domestic noise. Öhrström and Skånberg (1996) employed the terms “observe” and “annoy” to obtain ratings of the effects of exposure to noise and vibration from railway traffic. Woodroof and Griffin (1987) asked residents near railway lines to rate their “annoyance” from railway-induced building vibration. Watts (1984) asked residents to provide ratings of “bother” caused by noise and vibration from road traffic. Fields and Walker (1977) asked residents to rate their “bother” and “annoyance” from railway noise and vibration. In the current questionnaire, respondents were asked to provide ratings of “bother, annoyance and disturbance”. These response terms were selected as encompassing most likely reactions of residents to building vibration from common sources. Use of these terms allows comparison of questionnaire data with findings from the environmental and domestic noise surveys by Grimwood *et al.* (2000) and Stansfeld *et al.* (2000) who also obtained ratings of bother, annoyance and disturbance.

2.2 Rating scales

The questionnaire employs both numerical and semantic rating scales. Seven-point numerical rating scales are used to indicate satisfaction with the home or neighbourhood,

and to rate bother, annoyance or disturbance caused by vibration and noise. A 5-point semantic is employed for other questions on bother, annoyance or disturbance. The use of the two scales allows the results to be tested for consistency and reliability by correlating the responses obtained with the 5-point and 7-point scales.

The 5-point semantic scale is the same as that employed by Grimwood *et al.* (2002). The 7-point numerical scale is similar to that used in the noise survey reported by Stansfeld *et al.* and the same as that employed by Woodrooff and Griffin (1987) in a study of responses to railway-induced building vibration. The use of similar scales makes it possible to compare responses with those obtained in these other surveys.

2.3 *The use of filter questions*

The use of filter questions in social surveys, for example asking about responses to a specific event only if respondents report perceiving it, has been reported to bias the results of social surveys. Skinner *et al.* (2002) compared the results of two surveys of attitudes to environmental noise. One of the surveys employed a questionnaire that made extensive use of filter questions. They concluded that if responses to a specific noise source were requested only when the respondents reported they "had heard" that noise, responses were biased, with a greater proportion indicating they were affected because the question was not asked of those who had not "heard" it. The authors suspected that "heard" may have been interpreted variously as either "noticed", "affected" or "bothered", in which case some responses from those who heard the noise but were unaffected by it may have been filtered out inadvertently. Skinner *et al.* conclude that filter questions may introduce errors if there are several possible interpretations of the filter question and so recommend that filtering should be kept to a minimum and the phrasing and consequences of any such routing should be considered carefully. The current questionnaire makes minimal use of filter questions. No filter questions are employed in questions that might be used to determine exposure-response relationships.

2.4 *Means of perceiving vibration*

Building vibration may be perceived as a result of vibration being transmitted to the body from surfaces supporting the body, such as floors, chairs, or beds. For this type of stimulus, respondents are asked to rate annoyance, bother or disturbance caused by feeling vibration of the floor, chair or bed using a 5-point semantic scale (Figure 1). If the response is "not at all", "don't know" or "don't feel", further questions follow to ascertain whether vibration is ever felt. A "don't feel" option is selected if the response to the additional questions is that the respondent never feels vibration. Hence, ratings are obtained only if vibration is perceived.

This avoids contamination of the results by the inclusion of the lowest rating when vibration is not perceived.

The perception of vibration other than by feeling the vibration (e.g., as a result of the rattling of objects, the swaying of lights, or the noise caused by the vibration of surfaces) is addressed separately from feeling vibration. Respondents are asked whether they ever hear things rattle or see things vibrate, shake or sway, what they think this is caused by, whether it interferes with aspects of their home life, and the associated degree of bother, annoyance, or disturbance (see Figure 2). In these questions, “hear or see” is in bold and underlined text so that these words are emphasised by the interviewer to ensure that the respondent distinguishes these perceptions from the feeling of vibration transmitted to the body from the floor, chair or bed. Elsewhere, where appropriate, “feel” is in bold and underlined text.

27.A Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home; how bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **cars, lorries, buses or other road vehicles**? Show card 8:

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27B	Sometimes	<input type="checkbox"/> Go to (i)			
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 B							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27 B	Sometimes	<input type="checkbox"/> Go to (i)			
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27 B	Sometimes	<input type="checkbox"/> Go to (i)			
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from <u>cars, lorries, buses or other road vehicles</u> ? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

Figure 1 Example question on the perception of vibration by feeling.

31. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), how bothered, annoyed or disturbed are you by **hearing or seeing vibration, rattling, shaking or swaying** of things caused by.....? Show card 8

	not at all	A little	Moderately	very	extremely	don't hear or see
a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
b. Aircraft	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
c. Overground trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
d. Underground trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
e. Quarrying or mining	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
f. Construction	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
g. Road works	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
h. Footfalls, slamming doors, domestic appliances inside your home	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
j. Other (<i>specify</i>)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

Figure 2 Example question on the perception of vibration by hearing or seeing.

2.5 Order of questions

Skinner *et al.* (2002) suggest that differences in the order of questions in two questionnaires employed in surveys of environmental noise may have contributed to differences in responses. They suggest that awareness of environmental noise issues may increase during the interview resulting in higher responses in later questions. They also suggest that a general noise question may elicit more accurate responses when preceded by questions on specific noise sources which may act as a prompt or reminder about past experiences. In the present questionnaire, a general question on the degree of bother, annoyance or disturbance from vibration or noise is placed after questions on specific aspects of vibration or noise. Questions on sensitivity to noise and vibration are placed after questions on ratings of vibration and noise so as to avoid any influence of sensitivity questions on the ratings of noise and vibration.

3. Questionnaire structure and content

The questionnaire begins with a section in which the interviewer reports on dwelling and location information. Section 2 consists of questions concerning duration and hours of occupancy, and number of occupants. The third and fourth sections consist of questions on likes and dislikes about aspects of the neighbourhood and home. In the fifth and sixth sections, questions focus on feeling vibration, followed by questions on the perception of vibration other than by feeling. The seventh and eight sections focus on noise. In Section 9, respondents are asked to indicate their preference for a reduction in either noise or vibration, to provide ratings of their response to combined noise and vibration and to rate their sensitivity to vibration and noise. Section 10 obtains the age of the respondent and the ownership or tenancy of the dwelling. In the final section, the interviewer is asked to provide information on either feeling vibration or perceiving it by other means during the interview.

4. Questionnaire analysis methodology

Statistical analyses of responses from the questionnaire can test the reliability of the responses and examine relationships between subjective responses and objective measures of vibration exposure.

Spearman's rank correlation coefficient may be applied to test for consistency between ratings of bother, annoyance or disturbance, to test for agreement between ratings on different annoyance scales and between questions on perception and annoyance. The Wilcoxon matched-pairs signed ranks test may be employed to test for differences between noise ratings and vibration ratings for the same source, and to test for differences between ratings of annoyance caused by the perception of vibration by feeling, hearing or seeing. To determine whether questions on annoyance caused by vibration or noise produce different responses for different sources of vibration or noise, the Friedman test may be applied.

Factor analysis may be employed to assist the identification of underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. The Keiser-Meyer-Olkin and Bartlett tests may be applied to responses from specific questions to determine whether the data are suitable for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy tests whether the partial correlations among variables are small. Bartlett's test of sphericity indicates whether the correlation matrix is an identity matrix, which would indicate that the factor model is inappropriate.

Explorations of the relationships between subjective responses and objective measures of vibration and noise may involve partial and multiple correlation analyses. Logistic regression may also be employed to investigate the relationships between variables, for example, to

model the probability of feeling annoyed by vibration from predictor variables such as the distance from the source of vibration, or a measure of the vibration magnitude, or dose. Simple logistic regression (univariate analysis) and multiple logistic regression (multivariate analysis) may be conducted to investigate relationships between single dependent variables and one or more independent variables.

5. Acknowledgements

Comments on the questionnaire from Professor Stephen Stansfeld (Queen Mary's College, University of London), Su Buttress (Transport Research Laboratory), Colin Cobbing (Temple Group Ltd.), David Hiller and Richard Greer (Arup Acoustics), and the support of the Department for Environment, Food and Rural Affairs are gratefully acknowledged.

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Appendix 1

Social survey questionnaire

A social survey questionnaire of responses to vibration in residential buildings

SECTION A: interview and dwelling information

1. Serial number	
2. Address	

Interview details

3. Date	
4. Interview start time	
5. Interview end time	
6. Site number	

Dwelling information (to be completed by interviewer after obtaining clarification from interviewee where necessary)

7. In which of the following is the dwelling situated? *Mark one of the following*

Centre of a large city	<input type="checkbox"/> ₁	Village or small town	<input type="checkbox"/> ₄
Suburbs/outskirts of a large city	<input type="checkbox"/> ₂	Countryside	<input type="checkbox"/> ₅
Large town or small city	<input type="checkbox"/> ₃	Other	<input type="checkbox"/> ₆

(please specify)

8. Type of dwelling

detached	<input type="checkbox"/> ₁	apartment	<input type="checkbox"/> ₅
Semi-detached	<input type="checkbox"/> ₂	bed-sit	<input type="checkbox"/> ₆
terraced	<input type="checkbox"/> ₃	Other	<input type="checkbox"/> ₇
End terrace	<input type="checkbox"/> ₄	(Please specify)	

9. a. Number of storeys if detached, semi or terraced.

1 2 3 4 Other (specify)

₁

₂

₃

₄

₅

OR

b. Floor if apartment or bed-sit

Ground floor 1st 2nd 3rd Other (specify)

₁

₂

₃

₄

₅

SECTION B: Occupancy information

Introduction to be read to interviewee

We are conducting a survey on behalf ofon the effects ofon people in their homes. We are interested in your views about living in this area and how satisfied you are with different aspects of your neighbourhood and home. The survey will take 30 to 40 minutes. If you are not able to take part now, is there a more convenient time that I could call back?

Appointment time

10. How long have you been living at this address? *Select one. Show card 1*

Less than 6 months

 ₁

Please specify how long.

(If less than 1 week, please thank and close)

6 months up to 1 year

 ₂

Over 1 year, up to 2 years

 ₃

Over 2 years, up to 5 years

 ₄

Over 5 years

 ₅

11. During a typical **weekday** (Monday to Friday), how many hours, both day and night, do you spend inside this house? *Select one. Show card 2*

Less than 10 hours

 ₁

10 - 14 hours

 ₂

14 - 18 hours

 ₃

More than 18 hours

 ₄

12. During a typical **weekend day** (Saturday or Sunday), how many hours, both day and night, do you spend inside this house? *Select one. Show card 2*

Less than 10 hours

 ₁

10 - 14 hours

 ₂

14 - 18 hours

 ₃

More than 18 hours

 ₄

13. How many adults and children live at this address?

Number of adults (18 years or over)

 ₁

Number of children (under 18 years)

 ₂

SECTION C Satisfaction with neighbourhood

14. On the whole, how much do you like living in this **neighbourhood**? Choose a number to show your rating.
Show card 3

don't like at all							like very much	
1	2	3	4	5	6	7	1	2
<input type="checkbox"/>								

15. How would you rate this **neighbourhood** for **each** of the following? *Show card 4*

	Very poor							Excellent	
	1	2	3	4	5	6	7	1	2
a. Being close to the shops	<input type="checkbox"/>								
b. Standard of the local schools	<input type="checkbox"/>								
c. Up-keep of roads	<input type="checkbox"/>								
d. Appearance of buildings	<input type="checkbox"/>								
e. Quietness/peacefulness of the area	<input type="checkbox"/>								
f. Parks and open spaces	<input type="checkbox"/>								
g. Public transport	<input type="checkbox"/>								

16. Is there anything you particularly **like** about this **neighbourhood**? (*Several responses may be recorded; please prompt with "Anything else you particularly like?"*)

a. Any mention of quietness/ peacefulness / freedom from noises or disturbances (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
b. Any mention of sounds / noises that are liked (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
c. Any mention of vibrations that are liked (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
d. Any mention of possible sources of noise that are liked (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
e. Any mention of possible sources of vibrations that are liked (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
f. Any mention of aspects of railway/road/traffic that are liked (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
g. Any other features that are liked (<i>specify</i>)	<input type="checkbox"/>
.....	<input type="checkbox"/>
h. Nothing liked	<input type="checkbox"/>

17. Is there anything you particularly dislike about this neighbourhood? (Several responses may be recorded; please prompt with "Anything else you particularly like?")

- a. Any mention of noise or vibration/ noise or vibration effects / lack of peace and quiet / disturbances (specify) ₁
- b. Any mention of noises that are disliked (specify) ₂
- c. Any mention of vibrations that are disliked (specify) ₃
- d. Any mention of possible sources of noise that are disliked (specify) ₄
- e. Any mention of possible sources of vibrations that are disliked (specify) ₅
- f. Any mention of aspects of railway/road/traffic that are disliked (specify) ₆
- g. Any other features that are disliked (specify) ₇
- h. Nothing disliked (Go to Q19) ₈

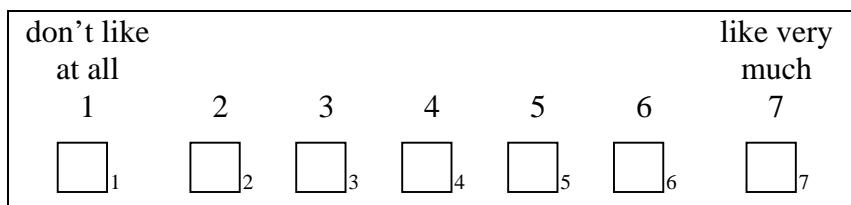
18. You mentioned that you dislike (select response in Q17), what effect does this have on your daily life? (Record any effects on daily life for each item selected in Q17)

- a. Noise or vibration / noise or vibration effects / lack of piece and quiet / disturbances
- b. Noises that are disliked
- c. Vibrations that are disliked
- d. Sources of noise that are disliked
- e. Sources of vibrations that are disliked
- f. Aspects of railway/road/traffic that are disliked
- g. Other features that are disliked

SECTION D: Satisfaction with home

19. On the whole, how much do you like living in this **home**? Choose a number to show your rating.

Show card 3:



20. What are the things you **like** about living in this **home**? (Several responses may be recorded; please prompt with "Anything else you particularly like?")

a. Any mention of quietness/ peacefulness / freedom from noises or disturbances (specify)

 1

.....

b. Any mention of sounds / noises that are liked (specify)

 2

c. Any mention of vibrations that are liked (specify)

 3

.....

d. Any mention of possible sources of noise that are liked (specify)

 4

e. Any mention of possible sources of vibrations that are liked (specify)

 5

f. Any other features that are liked (specify)

 6

g. Nothing liked

 7

21. Is there anything you **dislike** about living in this **home**? (Several responses may be recorded; please prompt with "anything else you particularly dislike?")

a. Any mention of noise or vibration/ noise or vibration effects / lack of peace and quiet / disturbances (specify)

 1

.....

b. Any mention of noises that are disliked (specify)

 2

c. Any mention of vibrations that are disliked (specify)

 3

.....

d. Any mention of possible sources of noise that are disliked (specify)

 4

e. Any mention of possible sources of vibrations that are disliked (specify)

 5

.....

f. Any mention of aspects of railway/road/traffic that are disliked (specify)

 6

.....

g. Any other features that are disliked (specify)

 7

h. Nothing disliked (Go to Q23)

 8

22. You mentioned that you dislike (*select response in Q21*), what effect does this have on your daily life? (*Record any effects on daily life for each item selected in Q21*)

- a. Noise or vibration / noise or vibration effects / lack of piece and quiet / disturbances
- b. Noises that are disliked
- c. Vibrations that are disliked
- d. Sources of noise that are disliked
- e. Sources of vibrations that are disliked
- f. Aspects of railway/road/traffic that are disliked
- g. Other features that are disliked

SECTION E: vibration questions

23. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home, do you ever **feel vibration or shaking** of the following? You may select more than one.

Show card 5:

- a. The floor 1
- b. A chair in which you are sitting 2
- c. A bed in which you are lying 3
- d. Other (*specify*) 4
- e. None felt (*Go to Q26*) 5

24. In which rooms do you **feel** this **vibration or shaking**? (*specify*)

.....

25. What do you think this **vibration or shaking** that you **feel** is caused by? You may select more than one.
Show card 6:

a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1
b. Aircraft	<input type="checkbox"/> 2
c. Overground trains	<input type="checkbox"/> 3
d. Underground trains	<input type="checkbox"/> 4
e. Quarrying or mining	<input type="checkbox"/> 5
f. Construction	<input type="checkbox"/> 6
g. Road works	<input type="checkbox"/> 7
h. Footfalls, slamming doors, domestic appliances inside your home	<input type="checkbox"/> 8
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 9
j. Other (<i>specify</i>)	<input type="checkbox"/> 10
k. Don't know	<input type="checkbox"/> 11

26. Does **feeling** **vibration or shaking** of the floor, chair or bed interfere with any of these aspects of your home life? You may select more than one. *Show card 7:*

a. Listening to TV, radio, music	<input type="checkbox"/> 1
b. Having a conversation (including on the telephone)	<input type="checkbox"/> 2
c. Reading, writing or other quiet activities	<input type="checkbox"/> 3
d. Concentrating	<input type="checkbox"/> 4
e. Resting	<input type="checkbox"/> 5
f. Sleeping	<input type="checkbox"/> 6
g. Other (<i>specify</i>)	<input type="checkbox"/> 7
h. No	<input type="checkbox"/> 8

27. A. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home; how bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **cars, lorries, buses or other road vehicles**? Show card 8:

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27B	Sometimes	<input type="checkbox"/> Go to (i)			
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 B							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27 B	Sometimes	<input type="checkbox"/> Go to (i)			
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27 B	Sometimes	<input type="checkbox"/> Go to (i)			
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from cars, lorries, buses or other road vehicles . Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 B. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **aircraft**? Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27C	Sometimes	<input type="checkbox"/> Go to (i)			
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 C							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27 C	Sometimes	<input type="checkbox"/> Go to (i)			
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	<input type="checkbox"/> Go to Q27 C	Sometimes	<input type="checkbox"/> Go to (i)			
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from aircraft ? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 C. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **overground trains?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never <input type="checkbox"/> Go to Q27D	Sometimes <input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 D							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never <input type="checkbox"/> Go to Q27 D	Sometimes <input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never <input type="checkbox"/> Go to Q27 D	Sometimes <input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from overground trains? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 D. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **underground trains?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never <input type="checkbox"/> Go to Q27E	Sometimes <input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 E							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never <input type="checkbox"/> Go to Q27 E	Sometimes <input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never <input type="checkbox"/> Go to Q27 E	Sometimes <input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from underground trains? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 E. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **quarrying or mining?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27F	<input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 F							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 F	<input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 F	<input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from quarrying or mining? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 F. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **construction?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27G	<input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 G							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 G	<input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 G	<input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from construction? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 G. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **roadworks?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27H	<input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 H							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 H	<input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 H	<input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from roadworks? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 H. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **footfalls, slamming doors, domestic appliances inside your home?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27I	<input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 I							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 I	<input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you <u>never</u> feel or <u>sometimes</u> feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 I	<input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by <u>feeling vibration</u> from footfalls, slamming doors, domestic appliances inside your home? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 I. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **footfalls, slamming doors, domestic appliances in neighbouring homes?** Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you never feel or sometimes feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27J	<input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q27 J							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you never feel or sometimes feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 J	<input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you never feel or sometimes feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q27 J	<input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by feeling vibration from footfalls, slamming doors, domestic appliances in neighbouring homes? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

27 J. How bothered, annoyed or disturbed are you by **feeling vibration or shaking** of the floor, chair or bed caused by **other things?** (please specify.....) Show card 8

Not at all	<input type="checkbox"/> 1	Please clarify, you never feel or sometimes feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q28	<input type="checkbox"/> Go to (i)					
A little	<input type="checkbox"/> 2								
Moderately	<input type="checkbox"/> 3	Go to Q28							
Very	<input type="checkbox"/> 4								
Extremely	<input type="checkbox"/> 5								
Don't feel	<input type="checkbox"/> 6	Please clarify, you never feel or sometimes feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q28	<input type="checkbox"/> Go to (i)					
Don't know	<input type="checkbox"/> 7	Please clarify, you never feel or sometimes feel this kind of vibration?	Never	Sometimes					
			<input type="checkbox"/> Go to Q28	<input type="checkbox"/> Go to (i)					
(i) So, can you confirm whether you are bothered, annoyed or disturbed by feeling vibration from other things? (please specify)? Show card 8									
not at all	<input type="checkbox"/> 1	a little	<input type="checkbox"/> 2	Moderately	<input type="checkbox"/> 3	Very	<input type="checkbox"/> 4	Extremely	<input type="checkbox"/> 5

28. Do you ever **hear** things rattle or **see** things vibrate, shake or sway in your home? You may select more than one. *Show card 9:*

a. Windows rattle	<input type="checkbox"/> 1
b. Objects rattle	<input type="checkbox"/> 2
c. Lights sway	<input type="checkbox"/> 3
d. Other (specify).....	<input type="checkbox"/> 4
e. No (<i>Go to Q29</i>)	<input type="checkbox"/> 5

29. What do you think this vibrating, rattling, shaking or swaying that you **hear or see** is caused by? You may select more than one. *Show card 6:*

a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1
b. Aircraft	<input type="checkbox"/> 2
c. Overground trains	<input type="checkbox"/> 3
d. Underground trains	<input type="checkbox"/> 4
e. Quarrying or mining	<input type="checkbox"/> 5
f. Construction	<input type="checkbox"/> 6
g. Road works	<input type="checkbox"/> 7
h. Footfalls, slamming doors, domestic appliances inside your home	<input type="checkbox"/> 8
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 9
j. Other (specify)	<input type="checkbox"/> 10
k. Don't know	<input type="checkbox"/> 11

30. Does **hearing or seeing vibration, rattling, shaking or swaying** of things in your home interfere with any of these aspects of your home life? You may select more than one.

Show card 7:

a. Listening to TV, radio, music	<input type="checkbox"/> 1
b. Having a conversation (including on the telephone)	<input type="checkbox"/> 2
c. Reading, writing or other quiet activities	<input type="checkbox"/> 3
d. Concentrating	<input type="checkbox"/> 4
e. Resting	<input type="checkbox"/> 5
f. Sleeping	<input type="checkbox"/> 6
g. Other (specify)	<input type="checkbox"/> 7
h. No	<input type="checkbox"/> 8

31. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), how bothered, annoyed or disturbed are you by **hearing or seeing vibration, rattling, shaking or swaying** of things caused by.....? Show card 8

	not at all	A little	Moderately	very	extremely	don't hear or see
a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
b. Aircraft	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
c. Overground trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
d. Underground trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
e. Quarrying or mining	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
f. Construction	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
g. Road works	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
h. Footfalls, slamming doors, domestic appliances inside your home	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
j. Other (specify)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6

32. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), how bothered, annoyed or disturbed are you by feeling, hearing or seeing vibration or shaking in your home?

Choose a number to show your rating. *Show card 10:*

Not at all						
1	2	3	4	5	6	7
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
extremely						

33. Are you concerned that this building may be damaged by **vibration or shaking**?

Yes	No
<input type="checkbox"/> 1	<input type="checkbox"/> 2

For railway sites only. SECTION F: railway vibration

34. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), how bothered, annoyed or disturbed are you by feeling, hearing or seeing vibration or shaking in your home from the **passage of nearby trains**? Choose a number to show your rating.

Show card 10:

Not at all						
1	2	3	4	5	6	7
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
<i>Go to Q38</i>						
extremely						

35. Does the **vibration or shaking** in your home from the **passage of trains** bother, annoy or disturb you at these times during the **week** (Monday to Friday)? You may select more than one. *Show card 11:*

- a. Day (07:00 - 19:00) 1
- b. Evening (19:00 - 23:00) 2
- c. Night (23:00 - 07:00) 3
- d. None of these 4

36. Does the **vibration or shaking** in your home from the **passage of trains** bother, annoy or disturb you at these times during the **weekend** (Saturday and Sunday)? You may select more than one. *Show card 11:*

- a. Day (07:00 - 19:00) 1
- b. Evening (19:00 - 23:00) 2
- c. Night (23:00 - 07:00) 3
- d. None of these 4

37. Is there one type of train that causes the most annoying or disturbing **vibration**?

Yes
1

No
2

Don't know
3

If yes:

(i) What type of train, passenger or freight?

Passenger
1

Freight
2

Don't know
3

(ii) How often does this type of train pass by?

Per 24 hours
1

Per hour
2

Don't know
3

(number per day/hour)

(iii) At what time of day or night does this type of train pass by? *Show card 11:*

Day (07:00 - 19:00) specify time(s) if possible:

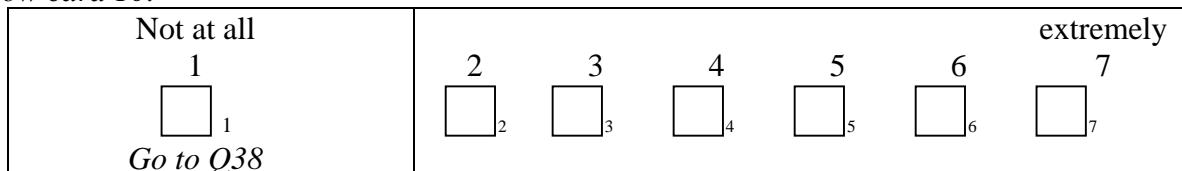
Evening (19:00 – 23:00) specify time(s) if possible:

Night (23:00 – 07:00) specify time(s) if possible:

For construction sites only. SECTION F: construction vibration

34. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), how bothered, annoyed or disturbed are you by **feeling, hearing or seeing vibration or shaking** in your home from the use of **nearby heavy construction machinery**? Choose a number to show your rating.

Show card 10:



35. Does the **vibration or shaking** in your home from **heavy construction machinery** bother, annoy or disturb you at these times during the **week** (Monday to Friday)? You may select more than one. Show card 11:

- a. Day (07:00 - 19:00) 1
- b. Evening (19:00 - 23:00) 2
- c. Night (23:00 - 07:00) 3
- d. None of these 4

36. Does the **vibration or shaking** in your home from **heavy construction machinery** bother, annoy or disturb you at these times during the **weekend** (Saturday and Sunday)? You may select more than one. Show card 11:

- a. Day (07:00 - 19:00) 1
- b. Evening (19:00 - 23:00) 2
- c. Night (23:00 - 07:00) 3
- d. None of these 4

37. Is there one type of **heavy construction machinery** that causes the most annoying or disturbing **vibration**?

Yes
 1

No
 2

Don't know
 3

If yes:

(i) What type of construction machinery?
piling or pounding machines, or other machines or lorries?

piling or pounding
machines

other
machines/lorrie

Don't know

1

2

3

(ii) How often does this type of disturbance occur?

(iii) At what time of day or night does this type of disturbance occur? *Show card 11:*

Day (07:00 - 19:00) specify time(s) if possible:

Evening (19:00 – 23:00) specify time(s) if possible:

Night (23:00 – 07:00) specify time(s) if possible:

SECTION G: Noise questions

38. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home, do you ever hear **noise** from the following? You may select more than one.

Show card 6:

a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1
b. Aircraft	<input type="checkbox"/> 2
c. Overground trains	<input type="checkbox"/> 3
d. Underground trains	<input type="checkbox"/> 4
e. Quarrying or mining	<input type="checkbox"/> 5
f. Construction	<input type="checkbox"/> 6
g. Road works	<input type="checkbox"/> 7
h. Footfalls, slamming doors, domestic appliances inside your home	<input type="checkbox"/> 8
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 9
j. Other (<i>specify</i>)	<input type="checkbox"/> 10
k. Don't know	<input type="checkbox"/> 11
l. No	<input type="checkbox"/> 12

39. Does **noise** interfere with any of these aspects of your home life? You may select more than one.

Show card 7:

a. Listening to TV, radio, music	<input type="checkbox"/> 1
b. Having a conversation (including on the telephone)	<input type="checkbox"/> 2
c. Reading, writing or other quiet activities	<input type="checkbox"/> 3
d. Concentrating	<input type="checkbox"/> 4
e. Resting	<input type="checkbox"/> 5
f. Sleeping	<input type="checkbox"/> 6
g. Other (<i>specify</i>)	<input type="checkbox"/> 7
h. No	<input type="checkbox"/> 8

40. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home; how bothered, annoyed or disturbed are you by **noise** from? *Show card 8*

	not at all	A little	Moderately	very	extremely	don't hear or see
a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
b. Aircraft	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
c. Overground trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
d. Underground trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
e. Quarrying or mining	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
f. Construction	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
g. Road works	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
h. Footfalls, slamming doors, domestic appliances inside your home	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
j. Passers-by (e.g. talking, car radios etc)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
k. Other (<i>specify</i>)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6
.....						

41. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), how bothered, annoyed or disturbed are you by **noise** in your home from all sources, including air, rail, road, construction, neighbours and passers-by? Choose a number to show your rating.

Show card 10:

Not at all	1	2	3	4	5	6	extremely
	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

For railway sites only. SECTION H: Railway noise

42. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home; how bothered, annoyed or disturbed are you by hearing **noise** from? *Show card 10:*

	Not at all 1	2	3	4	5	6	extremely 7
	<i>Go to Q46</i>						
a. Passage of nearby trains	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
b. Train horns	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
c. Stations (loudspeakers, etc.)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
d. Goods yards (shunting, freight handling, etc.)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
e. Railway / track maintenance	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

43. Does the **noise** in your home from the **passage of trains** bother, annoy or disturb you at these times during the week (Monday to Friday)? You may select more than one. *Show card 11:*

a. Day (07:00 - 19:00)	<input type="checkbox"/> 1
b. Evening (19:00 - 23:00)	<input type="checkbox"/> 2
c. Night (23:00 - 07:00)	<input type="checkbox"/> 3
d. None of these	<input type="checkbox"/> 4

44. Does the **noise** in your home from the **passage of trains** bother, annoy or disturb you at these times during the weekend (Saturday and Sunday)? You may select more than one. *Show card 11:*

a. Day (07:00 - 19:00)	<input type="checkbox"/> 1
b. Evening (19:00 - 23:00)	<input type="checkbox"/> 2
c. Night (23:00 - 07:00)	<input type="checkbox"/> 3
d. None of these	<input type="checkbox"/> 4

45. Is there one type of train that causes the most annoying or disturbing **noise**?

Yes

No
2

Don't know
 1

If yes:

(i) What type of train, passenger or freight?

Passenger

Freight

Don't know

(ii) How often does this type of train pass by?

Per 24 hours

Per hour

(number per day/hour)

1

2

(iii) At what time of day or night does this type of train pass by? *Show card 11:*

Day (07:00 - 19:00)

specify time(s) if possible:

1. **What is the primary purpose of the study?**

Evening (19:00 – 23:00)

specify time(s) if possible:

1. **What is the primary purpose of the study?**

Night (23:00 – 07:00)

specify time(s) if possible:

For construction sites only. SECTION H: construction noise

42. Thinking about the last 12 months (or over the period of occupancy if less than 12 months), when you are in your home; how bothered, annoyed or disturbed are you by hearing **noise** from? *Show card 10:*

	Not at all 1	2	3	4	5	6	extremely 7
	<i>Go to Q46</i>				<i>Go to Q43</i>		
a. Piling or pounding machines	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
b. Lorries on construction sites	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
c. Other construction machines	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

43. Does the **noise** in your home from the **heavy construction machinery** bother, annoy or disturb you at these times during the week (Monday to Friday)? You may select more than one. *Show card 11:*

a. Day (07:00 - 19:00)	<input type="checkbox"/> 1
b. Evening (19:00 - 23:00)	<input type="checkbox"/> 1
c. Night (23:00 - 07:00)	<input type="checkbox"/> 1
d. None of these	<input type="checkbox"/> 1

44. Does the **noise** in your home from the **heavy construction machinery** bother, annoy or disturb you at these times during the weekend (Saturday and Sunday)? You may select more than one. *Show card 11:*

a. Day (07:00 - 19:00)	<input type="checkbox"/> 1
b. Evening (19:00 - 23:00)	<input type="checkbox"/> 1
c. Night (23:00 - 07:00)	<input type="checkbox"/> 1
d. None of these	<input type="checkbox"/> 1

45. Is there one type of **heavy construction machinery** that causes the most annoying or disturbing **noise**?

Yes
 1

No
 2

Don't know
 1

If yes:

(i) What type of construction machinery? piling or pounding other Don't know
piling or pounding machines, or other machines lorries
machines

1

2

3

s

(ii) How often does this type of disturbance occur?

(iii) At what time of day or night does this type of disturbance occur? *Show card 11:*

Day (07:00 - 19:00)	<input type="checkbox"/> specify time(s) if possible:	<input type="text"/>
Evening (19:00 – 23:00)	<input type="checkbox"/> specify time(s) if possible:	<input type="text"/>
Night (23:00 – 07:00)	<input type="checkbox"/> specify time(s) if possible:	<input type="text"/>

SECTION I: Comparison of noise and vibration, glazing, traffic visibility, sensitivity

46. Thinking about the last 12 months, how bothered, annoyed or disturbed are you by **vibration and noise** in your home from **all sources**, including air, rail, road, construction, and neighbours?

Choose a number to show your rating. *Show card 10:*

<p>Not at all</p> <p>extremely</p>						
1	2	3	4	5	6	7
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

47. Considering **vibration and noise** in your home from **all sources**, including air, rail, road, construction, neighbours, and passers-by which would you prefer to be reduced, the vibration or the noise?

vibration	noise
<input type="checkbox"/> 1	<input type="checkbox"/> 2

48. *Railway sites only*

Considering **vibration and noise** in your home from the **passage of nearby trains**, which would you prefer to be reduced, the vibration or the noise?

vibration	noise
<input type="checkbox"/> 1	<input type="checkbox"/> 2

48. *Construction sites only*

Considering **vibration and noise** in your home from **nearby heavy construction machinery**, which would you prefer to be reduced, the vibration or the noise?

vibration	noise
<input type="checkbox"/> 1	<input type="checkbox"/> 2

49. Is there anything else you would like to say about **vibration and noise** in your home?

50. Thinking about the time while we have been speaking, would you say that you can usually feel more, less or the same vibration?

Usually more

 ₁

Usually less

 ₂

Usually same

 ₃

51. On this scale, how sensitive would you say you are to **vibration** in general?

Show card 12:

Not at all
sensitive

 ₁
 ₂
 ₃
 ₄
 ₅
 ₆

Extremely
sensitive

 ₇

52. On this scale, how sensitive would you say you are to **noise** in general?

Show card 12:

Not at all
sensitive

 ₁
 ₂
 ₃
 ₄
 ₅
 ₆

Extremely
sensitive

 ₇

53. Can you tell me whether all the windows in your home are double-glazed (full glazing), only some of them (partial glazing) or no windows double-glazed?

Full glazing

Partial glazing

No glazing

 ₁
 ₂
 ₃

54. Which sources of noise or vibration are visible from within your home?

Road traffic

Rail traffic

Air traffic

construction

Other, specify

 ₁
 ₂
 ₃
 ₄
 ₅

.....

55. Is passing traffic on any of the following roads or railways visible from within your house from? *You may mark more than one. Show card 13*

- a) Motorway 1
- b) Other dual carriageway road 2
- c) Single carriageway main road 3
- d) Residential / estate road 4
- e) Country lane 5
- f) railway track 6
- g) Other (specify) 7
- h) None of these 8

SECTION J: Gender, age, ownership/tenancy

56. *Gender*

Male	Female
<input type="checkbox"/> 1	<input type="checkbox"/> 2

57. In which of these age categories are you? *Show card 14:*

16-18	19-24	25-34	35-44	45-54	55-64	Over 65
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

58. Which of these describes the ownership of your home? Select **one**.

Being bought on a mortgage	<input type="checkbox"/> 1
Owned outright by household	<input type="checkbox"/> 2
Rented from local authority	<input type="checkbox"/> 3
Rented from private landlord	<input type="checkbox"/> 4
Rented from registered social landlord (RSL)	<input type="checkbox"/> 5
Other.....	<input type="checkbox"/> 6

End of Questionnaire

Interview end time:

Interviewer: now complete Section K

SECTION K Interviewer assessment of vibration and noise

59. While in the dwelling, did you **feel** vibration or shaking of the following? You may mark more than one.

- a. The floor 1
- b. The chair in which you were sitting 2
- c. Other (*specify*) 3
- d. None of these *Go to Q61* 4

60. What do you think this vibration is caused by? You may mark more than one.

- a. Cars, lorries, buses or other road vehicles 1
- b. Aircraft 1
- c. Overground trains 1
- d. Underground trains 1
- e. Quarrying or mining 1
- f. Construction 1
- g. Road works 1
- h. Footfalls, slamming doors, domestic appliances inside your home 1
- i. Footfalls, slamming doors, domestic appliances in neighbouring homes 1
- j. Other (*specify*) 1
- k. Don't know 1

61. In which rooms did you feel vibration or shaking? (*specify*)

.....

62. While in the dwelling, did you see or hear any of the following? You may mark more than one.

a. Rattling of the windows	<input type="checkbox"/> 1
b. Rattling of objects	<input type="checkbox"/> 1
c. Swaying of pendulum lights	<input type="checkbox"/> 1
d. Other vibration (<i>specify</i>)	<input type="checkbox"/> 1
e. None of these <i>Go to Q64</i>	<input type="checkbox"/> 1

63. What do you think this vibration is caused by? You may mark more than one.

a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1
b. Aircraft	<input type="checkbox"/> 1
c. Overground trains	<input type="checkbox"/> 1
d. Underground trains	<input type="checkbox"/> 1
e. Quarrying or mining	<input type="checkbox"/> 1
f. Construction	<input type="checkbox"/> 1
g. Road works	<input type="checkbox"/> 1
h. Footfalls, slamming doors, domestic appliances inside the home	<input type="checkbox"/> 1
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 1
j. Other (<i>specify</i>)	<input type="checkbox"/> 1
k. Don't know	<input type="checkbox"/> 1

64. While in the dwelling, did you hear **noise** from the following? You may select more than one.

a. Cars, lorries, buses or other road vehicles	<input type="checkbox"/> 1
b. Aircraft	<input type="checkbox"/> 1
c. Overground trains	<input type="checkbox"/> 1
d. Underground trains	<input type="checkbox"/> 1
e. Quarrying or mining	<input type="checkbox"/> 1
f. Construction	<input type="checkbox"/> 1
g. Road works	<input type="checkbox"/> 1
h. Footfalls, slamming doors, domestic appliances inside the home	<input type="checkbox"/> 1
i. Footfalls, slamming doors, domestic appliances in neighbouring homes	<input type="checkbox"/> 1
j. Other	<input type="checkbox"/> 1
k. None of these	<input type="checkbox"/> 1

Location information

65. Residential area type. *Mark one of the following.*

Mostly residential/housing estate	<input type="checkbox"/> 1
Mixed residential/commercial (shops/offices)	<input type="checkbox"/> 2
Mixed residential/ industrial (factories)	<input type="checkbox"/> 3
Mostly industrial/ commercial, with some residential	<input type="checkbox"/> 4
Mixed residential/countryside	<input type="checkbox"/> 5
Mostly countryside	<input type="checkbox"/> 6

INTERVIEWER DECLARATION

I declare that this is a true record of an interview for this survey, and has been conducted within the MRS code of conduct.

Interviewer Name

Signature

Date

Interviewer, Please note below any difficulties encountered with completing questionnaire (for example questions the Respondent had difficulty in understanding, problems with the interview etc)

Appendix 2

Social survey questionnaire show cards

**A social survey questionnaire of responses
to vibration in residential buildings: Show
cards**

Show card 1

- Less than 6 months
- 6 months up to 1 year
- Over 1 year, up to 2 years
- Over 2 years, up to 5 years
- Over 5 years

Show card 2 (Q11, Q12)

Less than 10 hours	10 to 14 hours	14 to 18 hours	More than 18 hours
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Show card 3 (Q14, Q19)

don't like at all	1	2	3	4	5	6	7	like very much
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Show card 4 (Q15)

Very poor	1	2	3	4	5	6	7	Excellent
-----------	---	---	---	---	---	---	---	-----------

Show card 5 (Q23)

- a. The floor
- b. A chair in which you are sitting
- c. A bed in which you are lying
- d. Other (*specify*)

Show card 6 (Q25, Q29, Q38)

- a. Cars, lorries, buses or other road vehicles
- b. Aircraft
- c. Overground trains
- d. Underground trains
- e. Quarrying or mining
- f. Construction
- g. Road works
- h. Footfalls, slamming doors, domestic appliances inside the home
- i. Footfalls, slamming doors, domestic appliances in neighbouring homes
- j. Other (*specify*)

Show card 7 (Q26, Q30, Q39)

- a. Listening to TV, radio, music
- b. Having a conversation (including on the telephone)
- c. Reading, writing or other quiet activities
- d. Concentrating
- e. Resting
- f. Sleeping
- g. Other (*specify*)

Show card 8 (Q27, Q31, Q40)

not at all	a little	moderately	very	extremely
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Show card 9 (Q28)

- a. Windows rattle
- b. Objects rattle
- c. Lights sway
- d. Other (*specify*)

Show card 10 (Q32, Q34, Q42, Q46)

Not at all	1	2	3	4	5	6	7	extremely
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Show card 11 (Q35, Q36, Q37, Q43, Q44, Q45)

- Day (07:00 - 19:00)

- Evening (19:00 - 23:00)

- Night (23:00 - 07:00)

Show card 12 (Q51, Q52)

Not at all sensitive	1	2	3	4	5	6	7	Extremely sensitive
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Show card 13 (Q55)

- a) Motorway
- b) Other dual carriageway road
- c) Single carriageway main road
- d) Residential / estate road
- e) Country lane
- f) Railway track
- g) Other (*specify*)

Show Card 14 (Q57)

16-18	19-24	25-34	35-44	45-54	55-64	Over 65
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