CAPITA | Real estate and infrastructure

Bradbury & Oak Grove Farm Development

Noise Assessment Report

August 2021

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Quality Management

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P01	Nov20	First Issue	YW	GBW	DHJ
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Drawing(s)

1. Introduction

Relevant Dates

Development year 2036

Scope of Work

1.1 Capita Real Estate and Infrastructure, acting on behalf of Monmouthshire County Borough Council, has been commissioned to produce an Ambient Noise Level Assessment Report for the A48 between Pwllmeyric and Chepstow, assessing the impact of the proposed residential and light industrial/office development at Bradbury & Oak Grove Farm, Caldicot. This assessment of traffic noise has been carried out in accordance with the requirements of the Noise Insulation (Amendment) Regulations 1988.

General Background/Description of Scheme

1.2 Bradbury & Oak Grove Farm are situated between the B4245 and M48. It is approximately a third of a mile south of the village of Crick and half a mile east of Caldicot Town (refer to Drawing No. BFNR-CAP-00-XX-DR-A-0001 for site location plan).

1.3 The proposal is for a 'Garden Town', creating a new community urban extension of Caldicot, where a new community neighbourhood designed on garden city principles can create an environment that celebrates its landscape setting, promoting opportunities to adopt a healthy and sustainable lifestyle. Three new villages will be linked by a Green Infrastructure network connecting them to each other and the wider communities at Caldicot, Portskewett, Caerwent and beyond. There will be a focus on active travel, health and wellbeing, with walkable neighbourhoods being created. The proposed development consists of 960 new residential dwellings, 3.0 hectares of employment/depot and provision of a new primary school.

1.4 This report details the outcome of the following scope of work:

- Prepare a noise model using Noisemap Five (noise prediction software) and CRTN for pre and post construction (2036) scenarios of the scheme;
- Undertake a noise survey at various locations for validation of the noise model;
- To assess the potential impact of the increase in noise on the A48 between Pwllmeyric and Chepstow due to traffic associated with the development.

Purpose

1.5 This report assesses the change in noise along the A48 corridor between Pwllmeyric and Chepstow due to the proposed Bradbury & Oak Grove Farm development and compares the likely increase in traffic noise in accordance with the requirements of the Noise Insulation (Amendment) Regulations 1988.

1.6 This is a high-level study in which a scaled down modelling assessment has been undertaken to validate the traffic noise.

1.7 The study area that has been identified for this assessment is to review all properties within a 100m radius of the existing roads surrounding the A48 corridor, from Pwllmeyric to Chepstow. This is the extent of validation for the CRTN prediction methodology.

1.8 It should be noted that the majority of these buildings are single dwellings comprising of two floor levels. A limited number of properties correspond to multi-storey buildings; receptors have also been included at higher floors, where applicable.

1.9 A noise model was produced to validate the present climate and serves the purpose of predicting noise levels from fundamental variables such as classification of vehicles, traffic flow, speed of vehicles and sound emission levels. Traffic noise prediction models are required as aids for designing roads and highways. In addition, they are also used in the assessment of existing or envisaged changes in traffic noise conditions.

1.10 The proposed road traffic noise model can be effectively used as a decision support tools for prediction of traffic noise index of L10 (18h).

1.11 A glossary of acoustic terminology used in the report is contained in Appendix A.

2. Relevant Legislation

The Noise Insulation (Amendment) Regulations 1988

2.1 Regulation 3 of the Noise Insulation (Amendment) Regulations 1988 states that a Highway Authority is required to make offers of noise insulation to occupiers of residential properties where certain criteria are met. The three conditions which must all be satisfied to qualify are as follows:

(i) The predicted L10 (18 hour) noise level at the facade of a building, within 15 years of a road opening to traffic, must be at least 68 dB(A).

(ii) The relevant L10 (18 hour) noise level must be greater by at least 1 dB(A) than the noise level prevailing before the new road scheme.

(iii) Noise from the new or altered carriageway must make an effective contribution to the total noise level of at least 1 dB(A).

2.2 In addition, Regulation 4(4) provides a discretionary power enabling offers of insulation to be made for some non-qualifying dwellings where they form part of a contiguous facade.

2.3 The level of future traffic noise is assessed in accordance with the recommended method of prediction contained in the Department of Transport/Welsh Office Technical Memorandum "Calculation of Road Traffic Noise 1988" (CRTN). Calculations have been undertaken utilising the Noisemap calculation software.

2.4 Calculated noise levels are the L10 (18 hour) levels as required by the Regulations. L10 is defined as the noise level in dB(A) which is exceeded for 10% of a given period of time. In the Regulations, L10 (18 hour) is the arithmetic average of all hourly L10 values during the period 06.00 - 24.00 hours on a normal working day.

2.5 In order to determine eligibility, noise figures are calculated to 0.1 dB(A), and these values used to determine whether the requirements under paragraphs 2.1 (ii) and 2.1 (iii) are met.

2.6 Those properties adjacent to the proposed highway improvements were assessed, being located at the points where the change in noise is greatest.

2.7 Eligible buildings are dwellings and other buildings used for residential purposes within 300m of the new or altered road. Eligible rooms are living rooms, bedrooms or kitchen diners with no gas appliances, which have a qualifying window or door.

National Planning Policy Framework (NPFF)

2.8 Published in March 2012, NPFF has replaced a number of national policy documents with a brief document which is written simply and clearly and is intended to be more accessible to people and communities.

2.9 The document explains how the planning system should contribute to and enhance the natural and local environment. One of these is by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

2.10 Paragraph 123 is specifically related to noise, according to which, planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impact on health and quality of life arising from noise from new development, including through the use of condition;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Land Compensation Act 1973

2.11 Part 1 of the Land Compensation Act 1973 provides a right to certain homeowners to claim compensation where their homes are reduced in value by the use of a new road or railway or other public works. The reduction in value must arise as a direct result of noise, smell, fumes, smoke etc. arising from use of the scheme. **The Act currently makes no provision for compensation to be paid for reduction in value arising as a result of the construction works or loss of view.**

2.12 In order to claim, claimants must own the property on or before the date the road opens to traffic, and you must own and occupy your property when the claim is submitted (usually 12 months after the date the road opened). Non-resident landlords of tenanted properties can also claim provided the property is occupied by a tenant at the time the claim is submitted. Long leaseholders may also claim.

2.13 The level of future traffic noise is assessed in accordance with the recommended method of prediction contained in the Department of Transport/Welsh Office Technical Memorandum "Calculation of Road Traffic Noise" (CRTN). Calculations have been undertaken utilising the Noisemap Five calculation software.

2.14 Calculated noise levels are the L10 (18 hour) levels as required by the Regulations. L10 is defined as the noise level in dB(A) which is exceeded for 10% of a given period of time. In the Regulations, L10 (18 hour) is the arithmetic average of all hourly L10 values during the period 06.00 - 24.00 hours on a normal working day.

2.15 All properties in the vicinity of the new highway improvements were assessed. The results from the model summarise the increases and decreases in noise levels at the relevant façade of adjacent properties.

British Standard BS 6472-1:2008

2.16 The response of the human body to vibration is addressed in BS6472-1:2008. The threshold of human vibration is expressed in terms of a weighted (Wb) peak acceleration between 0.01 and 0.02 ms-2. Perception thresholds are slightly higher for vibration duration of less than 1 second.

2.17 This standard provides guidance on the acceptable levels of Vibration Dose (VDV) for residential properties for both the daytime (07:00 to 23:00) and the night-time (23:00 to 07:00) periods. These are given in Table 2.1:

Table 2.1: Acceptable Vibration Dose Values (VDV, $m/s^{1.75}$) in Residential Properties

Time	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
23:00 to 07:00	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Source: BS6472-1:2008

British Standard BS 5228

2.18 British Standard BS 5228: Parts 1 and 2: 2009 Noise and Vibration Control on Construction and Open Sites provides basic guidance on the control of noise and vibration from constructionactivity.

2.19 There are no regulations that provide limits for construction noise and vibration. The Control of Pollution Act 1974 leaves it to local authorities to recommend criteria appropriate to their area of jurisdiction.

BS5228-1:2009 Noise and Vibration Control on Construction and Open Sites – Noise

2.20 BS5228-1 provides generic source noise data for various items of plant used on open sites along with methods for calculating the effects of these activities and their respective noise levels at nearby noise sensitive properties.

2.21 BS5228: 2009 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' gives recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels. BS5228:2009 provides generic source noise data for various items of plant used on open sites along with methods for calculating the effects of these activities and their respective noise levels at nearby noise sensitive properties.

2.22 Annex E to the standard provides guidance on the significance of noise effects and examples of noise limits for construction noise. These are based on the noise limits from the DoE Advisory Leaflet 72 1976 'Noise Control on Building Sites' which have traditionally been adopted as best practice. Leaflet 72 advised that noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut. Noise levels, between

07:00 and 19:00 hours, outside the nearest window of the occupied room closest to the site boundary, should not exceed:

"… 70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise; or 75 decibels (dBA) in urban areas near main roads in heavy industrial areas."

2.23 BS 5228 identifies two methodologies for assessing the significance of construction noise based on the noise change in relation to the pre-existing noise climate (i.e. the pre-construction baseline). The approach taken in this assessment is based on the ABC method as shown in Table 2.2 below.

Table 2.2: BS5228 Recommended Construction Noise Limits

Assessment category and threshold value period	Threshold value, in decibels ($L_{Aeq\ T}$) (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

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.

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 3dB due to construction activity.

NOTE 3 Applied to residential receptors only.

(A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

(B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

(C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

(D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

Source: BS 5228:2009

BS5228-2:2009 Noise and Vibration Control on Construction and Open Sites - Vibration

2.24 BS5228-2 provides guidance on the significance of vibration and provides guidance on vibration minimisation on construction sites. BS5228-2 states:

"Vibrations, even of very low magnitude, can be perceptible to people and can interfere with the satisfactory conduct of certain activities, e.g. delicate procedures in hospital operating theatres, use of very sensitive laboratory weighing equipment. Vibration nuisance is frequently associated with the assumption that, if vibrations can be felt, then damage is inevitable; however, considerably greater levels of vibration are required to cause damage to buildings and structures (see, for example, BS 7385-2) or to cause computers and similar electronic equipment to malfunction. Vibrations transmitted from site activities to the neighbourhood can, therefore, cause anxiety as well as annoyance, and can disturb sleep, work or leisure activities. In any neighbourhood, some individuals will be more sensitive to vibration than others. The significance of vibration effects should be assessed in accordance with Annex B."

2.25 An extract of BS 7385-2: 1993 is shown in Table 2.3below:

Table 2.3: Transient Vibration Guide Values Relating to Cosmetic Damage to Buildings from Construction Operations

Type of Building	Peak component Particle Velocity in Frequency Range of Predominant Pulse [1]	
	4Hz to 15Hz	15Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50mm/s at 4Hz and above.	Reinforced or framed structures. Industrial and heavy commercial buildings.
Un-reinforced or light framed structures. Residential or light commercial buildings.	15mm/s at 4Hz increasing to 20mm/s at 15Hz.	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above.
Note 1: Values referred to are at the base of the building. Note for line 2: At frequencies below 4Hz, a maximum displacement of 0.6mm (zero to peak) is not to be exceeded.		

Source: BS7385-2:1993

3. Traffic Flows

3.1 Three Automatic Traffic Counts (ATCs) were undertaken in July 2020, along the A48 corridor at Chepstow and Pwllmeyric, during the regional COVID-19 pandemic lockdown. It is widely accepted that due to the pandemic there is a general reduction in the volume of traffic on the nearby roads due to associated travel restrictions. It is also anticipated that noise levels measured during the traffic surveys are therefore likely to under-represent the noise environment that is typically present in the area, to a certain extent.

3.2 The purpose of carrying out the ATCs was to assist the validation and prediction of the noise model.

3.3 Traffic flows used for the 2036 traffic noise assessment are based on scoping discussions with Monmouthshire County Council's Highways Department regarding the transport assessment associated with the site. The trip generation and distribution and of development traffic and the impact of this traffic on the strategic highway network has been undertaken via use of the South East Wales Transport Model. The model has been developed and analysed by Transport for Wales to provide clarity and confidence in the traffic flow assessment. Caldicot is within the Fully Modelled Area (FMA) but sits to the east of the Area of Detailed Modelling (AoDM). Therefore, as part of assessing the impact of the development, Transport for Wales have added further detail into the highway part of the model, including new development zones where needed.

3.4 For the 2036 forecast year, the South East Wales Transport Model has two demographic scenarios:

(i) Core – this is capped to standard population and employment forecasts from the Experian dataset for each local authority. As local authority development plans tend to be more optimistic than the standard datasets (including Monmouthshire) then factoring down to control to Experian has the effect of reducing the scale of growth at each development site. The Core demographic scenario is generally used when looking at SE Wales regional impacts, to avoid overestimating trip growth which occurs when summing up several optimistic development forecasts.

(ii) Alternate – this is based purely on the development information provided by local authorities, which in the case of most authorities (including Monmouthshire) is higher in terms of population and employment than the standard Experian forecasts and incorporates "near certain" (constructed, under construction, or planning permission granted), "more than likely" (statutory planning process underway) and "reasonably foreseeable" (Masterplanning or early pre-planning work underway) development sites (2015-2036) from the TAG uncertainty log. This is on top of the existing 2015 population and employment for local authorities in SE Wales. The "reasonably foreseeable" category would not normally be included as per TAG, but for development related work it is considered to be appropriate to include this category. In Monmouthshire this means around 2,400 new dwellings and associated population growth 2015-2036. This level of growth is higher than the Experian forecasts which are used to control growth totals in the usual SEWTM "core" demographic forecasts.

3.5 For work relating to the impact of developments at a local level, Transport for Wales recommend the use of the Alternative scenario and therefore this has been used.

3.6 In the area around Caldicot, the following developments are included in the Alternate scenario as provided by Monmouthshire County Council for the development of the model. Unlike in the core scenario, these have not been subject to factoring down and capping:

- Crick Rd – 285 dwellings & 50 jobs by 2026
- Church Rd Caldicot – 130 dwelling by 2026
- Sudbrook – 210 dwellings by 2026
- Fairfield Mabey Chepstow – 350 dwellings & 400 jobs by 2026
- Rockfield Farm Undy – 266 dwellings & 258 jobs by 2026
- Vinegar Hill Undy – 225 dwellings by 2026
- Quay Point, Magor – 1962 jobs by 2026
- Gwent Europark, Magor – 581 jobs by 2026

3.7 Trip frequency in South East Wales Transport Model derives directly from the household travel surveys used to build the model. There is no further adjustment to the National Trip End Model (NTEM) or other trip rates. Due to changes in the development profile, the model analysis was based on 800 dwellings with an estimated 900 workers approx. to be resident in the zone (166 are assumed to be self-employed), plus 3.5 hectares of employment equating to 300 jobs in the zone and provision of a new primary school. This profile differs slightly from the final profile of 960 new residential dwellings, 3.0 hectares of employment/depot and provision of a new primary school. However, with the distance of the site from the study area and the majority of traffic being distributed to the west/south, the differences in noise levels will be minimal.

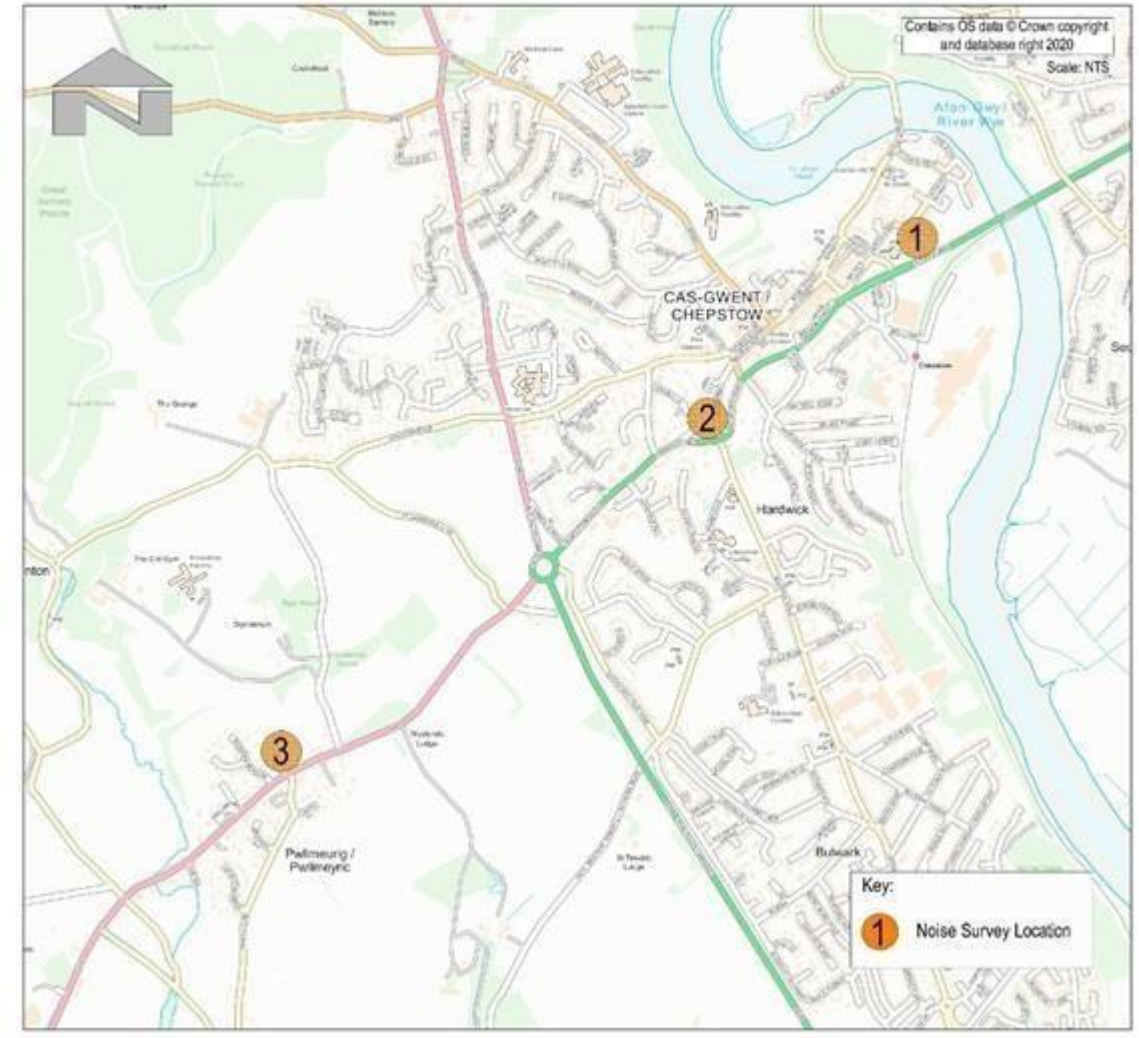
4. Methodology

4.1 All road traffic noise calculations have been undertaken in accordance with Calculation of Road Traffic Noise 1988 (CRTN) utilising the basic noise prediction charts taken from this guidance with the aid of the traffic flows obtained from the South East Wales Transport Model.

5. Measured Noise Levels

5.1 Capita Real Estate and Infrastructure carried out three CRTN noise surveys in July 2020, on the A48 between Chepstow and Pwllmeyric as per Figure 5.1 (see Drawing No. BFNR-CAP-00-XX-DR-A-0002 for exact locations).

Figure 5.1: Survey Locations



5.2 Noise surveys were carried out in July 2020 during the regional COVID-19 pandemic lockdown, and that this could have affected the volume of traffic on the nearby roads due to associated travel restrictions. Noise levels measured during survey are therefore likely to under-represent the noise environment that is typically present in the area, to a certainextent.

5.3 The noise surveys were carried out over a period of 3 hours. The measurements were taken using a Rion NL-52 noise meter environment analysers that was undertaken in a free field condition and positioned at a height of 1.2m/1.5m (see Appendix B for a description of the survey method, and equipment used).

5.4 The measured noise levels recorded and converted were:

Table 5.1: Noise Site Surveys (CRTN)

No.	Location	Measured Level – 2020 dB(A) (LAF10)	Calculated Level – 2020 dB(A) (LAF10)	Level Difference dB(A) (LAF10)
1	Free field survey 1	75.3 dB	73.9 dB	-1.4 dB
2	Free field survey 2	76.0 dB	76.1 dB	-0.1 dB
3	Free field survey 3	74.1 dB	74.1 dB	0 dB

5.5 From the tables, the above measurements were shown to compare favourably with the calculated levels.

5.6 It should be noted that the above measured results have been analysed to remove any anomalies that the site surveys might have recorded e.g. humans shouting / HGV's unloading / dogs barking etc.

5.7 For information purposes; a free field measurement contains no reflecting objects; hence, the sound level being measured is caused mainly by sound waves coming directly from the sound source. However, this can occur even if there are reflecting objects, if measurements are made close to the sound source. In this case the sound source was a busy highway hence the high noise levels recorded.

5.8 The measured and modelled road traffic noise data show a reasonably good correlation as the modelled noise level is only 1.4 dB below the measured noise level. A difference of this magnitude is considered as marginal so the noise model, in terms of road traffic noise, can be considered adequately verified.

5.9 This provides confidence that the noise model is predicting representative propagation from source to receiver and can be used to validate the predication of noise assessment of the proposed development.

6. Predicted Noise Levels

6.1 This chapter sets out the likely noise and vibration constraints that could arise as a result of the anticipated traffic volume along the A48 corridor from Chepstow to Pwllmeyric, associated with the proposed Bradbury & Oak Grove Farm development at Caldicot.

6.2 It should be noted that details on the proposed development are limited and this has dictated the scope of this assessment.

6.3 Noise effects in relation to the proposed development during operation have been predicted and appraised utilising the methodology presented within Annex 1 of the Calculation of Road Traffic Noise (CRTN).

6.4 CRTN sets out a step-by-step method for predicting road traffic noise levels in terms of LA10 for an 18-hour period (between 06:00 hours and midnight) at any distance up to 300m (in this instance of a high-level study 100m) from a highway. The prediction method takes into account the following factors to generate a Basic Noise Level (BNL) at a notional distance from the kerb: traffic flow, mean speed, the percentage of heavy vehicles, along with the road surface and gradient.

6.5 CRTN also includes procedures that enable the noise level at specific receptors to be determined by taking the BNL and applying corrections for distance, the presence of screening (barriers, buildings and topography), the type of intervening ground cover between the road and receiver, the angle of view of the road and reflections from façades.

6.6 At this stage the focus is on determining whether a change in road traffic noise of more than 1 dB in the short term is expected as a result of the highway improvements with the guidance for a scoping assessment contained within DMRB LA 111 Noise and Vibration Revision 2 (formally HD 213/11) (see Tables 7.1 and 7.2 overleaf for the classifications).

6.7 The guidance notes state that *"if sufficient traffic flow information is available then it is acceptable to use this to determine whether there is likely to be a change of 1dB LA10,18h in the short term…. which will result from a combination of traffic flow, speed and composition…".*

6.8 Whilst noise levels at individual receptors will eventually need to be determined and assessed, for now an assessment has been undertaken comparing the BNL calculated on a link-by-link basis for each scenario.

6.9 For this appraisal the difference in noise level in 2036 (the design year of the South East Wales Transport Model) with and without development has been determined, hence for the purpose of this study we are only looking at the impacts in accordance with DMRB LA 111 Noise and Vibration Revision 2 in the short term scenario only (Please see Tables 6.1 and 6.2 below for short term and long term classifications respectively). The scenarios that are appraised are set out below:

- 2036 'Do Minimum' and
- 2036 'Do Something'

Table 6.1: Classification of Magnitude of Noise Impacts in the Short Term

Change in Noise Level, dB(A)	Magnitude of Impact
0.0	No Change – No Impact
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
>5.0	Major

Table 6.2: Classification of Magnitude of Noise Impacts in the Long Term

Change in Noise Level, dB(A)	Magnitude of Impact
0.0	No Change – No Impact
0.1 – 2.9	Negligible
3.0 – 4.9	Minor
5.0 – 9.9	Moderate
>10.0	Major

6.10 The likely change in BNL have been considered qualitatively based on the number of properties lying within 100m of the A48 in Pwllmeyric and Chepstow. This route has been identified, as it is part of an Air Quality Management Area within Chepstow, although this does not preclude significant adverse effects arising at more distant locations.

6.11 The options appraisal described above is based on the perception of residents living close to the route and does not consider potential effects on flora, fauna or on amenity areas.

Desk Study

Baseline Conditions

6.12 The A48 passes through the village of Pwllmeyric onto Highbeech Roundabout which forms a, junction with the A48 and A466. Eastbound of the roundabout, the A48(T) passes the town of Chepstow. The A466 northbound heads towards Tintern and southbound the A466 (T) links to Junction 2 of the M48.

6.13 A total of 209 properties were assessed in the Noise Assessment Report. The results show that properties along the A48 corridor at Pwllmeyric and Chepstow will encounter a negligible noise increase of +0.1dB. The results of which (predicted Do Minimum and Do Something future noise levels) can be found in the Noise Schedule in Appendix D and on the noise contour plans in Appendix F.

Annex 1 - Calculation of Road Traffic Noise (CRTN)

6.14 Noise from a stream of traffic is not constant but varies from moment to moment and so it is necessary to use an index to arrive at a single figure estimate of the overall noise level for assessment purposes.

6.15 The CRTN describes procedures for predicting and measuring noise from road traffic in terms of the LA10 – the level exceeded for 10% of the time. A step-by-step method is presented for predicting road traffic noise levels in terms of LA10 for 18-hour period, between 06:00 hours and midnight, at any distance up to 300m from a highway. The prediction method takes into account the following factors to generate a Basic Noise Level (BNL) at a notional distance from the kerb:

traffic flow, mean speed, the percentage of heavy-duty vehicles (HDVs), along with the road gradient and surface.

6.16 The procedures also enable the noise level at specific receptors to be determined by taking the BNL and applying corrections for:

- distance;
- the type of intervening ground cover between the road and receptor;
- the presence of screening (barriers, buildings and topography);
- the angle of view of the road; and
- reflections from façades.

Traffic Related Factors

Traffic Flows

6.17 Traffic flows forms the basis of the Basic Noise Level (BNL); the greater the flow the greater the source noise level. The relationship is logarithmic, so a doubling of flow is required to generate a 3 dB(A) uplift in noise. A 25% increase (and 20% decrease) in flow equates to a change of 1 dB(A).

6.18 18-hour annual average weekday traffic (AAWT) flows, based on South East Wales Transport Model, provided by Transport for Wales have been used for this BNL analysis.

6.19 The LA10,18h is a statistical parameter and therefore there is a minimum flow required to generate a valid noise level and the CRTN prediction methodology requires that the 18-hour flow is 1000 vehicles or more. Therefore, it is reasonable to reject links where flows are below 1000 in one or more scenarios. Lightly trafficked road links with flows of less than 1000 are unlikely to contribute significantly to the overall road traffic noise levels at individual receptors.

6.20 Where a relatively low flow is present (between 1000 and 4000 18-hour AAWT) a correction has been applied. This correction is dependent on both vehicle flow and distance from the road link. In this case, for consistency, a distance of 10m from the nearside kerb has been assumed.

Proportion of Heavy-Duty Vehicles and Mean Traffic Speed

6.21 Vehicle speed and the proportion of heavy-duty vehicles combine to form a correction which is applied to the BNL. Above about 40 kph, the higher the speed and the higher the proportion of heavy-duty vehicles, the greater will be the correction. This correction can be significant. For example, with 20% heavy duty vehicles, reducing vehicle speed from 96 kph to 80 kph (60 mph to 50 mph) would result in a 1.2 dB(A) reduction in road traffic noise, all else remaining equal.

7. Summary

7.1 The purpose of this assessment was to identify the potential noise impacts from the proposed Bradbury & Oak Grove Farm development scheme and compares the likely increase in traffic noise along the A48 corridor between Pwllmeyric and Chepstow, in accordance with the requirements of the Noise Insulation (Amendment) Regulations 1988, which utilises CRTN methodology. This is a high-level study and scaled down modelling has been undertaken at this time.

7.2 This report identifies the baseline noise levels prior to the opening of the proposed scheme. The assessments have been undertaken in accordance with the appropriate methodology and gives reference to measured and calculated noise levels in the study area. The findings of which are summarised in Table 7.1 below.

Table 7.1: Summary of Results – Short Term (2036)

Noise Level Increase dB(A)	No. of Properties
<0.0	99
0.1 – 0.9	110
1.0 – 2.9	0
3.0 – 4.9	0
>5.0	0

7.3 Based on a total of 209 properties assessed, in accordance with the road traffic noise criteria, there is negligible increase of noise levels (+0.1dB) at 110 properties.

7.4 The likely noise and vibration levels that could arise as a result of the proposed development at Bradbury & Oak Grove Farm have been considered.

7.5 Given the proposed development scheme and existing flows, it appears to have negligible impacts for residents 100m from along the route to the development scheme.

7.6 However, the methodology carried out to date is a high-level desk study based on traffic flows only and doesn't take into consideration ground topography, which can make a significant difference in terms of how the noise can travel, which is where detailed noise modelling comes in. In addition to that if there were any issues with the source noise, this can be mitigated by the introduction of proposed noise barriers or the installation of noise reducing wearing course.

7.7 Mitigation options will significantly reduce the noise impacts on the existing residents for any of the options that are put forward. Hence, it is recommended that upon an evaluation, that a detailed noise modelling assessment is undertaken to determine the best course of action that will provide the greatest noise reduction for the residents close to the scheme.

Appendix A
Glossary of Acoustic Terminology

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Table A1: Glossary of Acoustic Terminology

CRTN	Calculation of Road Traffic Noise
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A2: Typical Sound Levels Found In the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Appendix B
Survey Method and Equipment

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Equipment

Noise levels were measured using a Rion NL 52 environmental noise analyser (serial number: 00943362) calibrated in the field with a Rion NC74–field calibrator (serial number: 34546649). The equipment, complying with the type-1 rating in BS5969 was calibrated to comply with the manufacturer's performance specification on the 05th September 2019.

Method

Measurements were taken in accordance with CRTN with the microphone mounted on a tripod/pole at a height of 1.2/1.5 metres above ground level, and measurements were undertaken in free field conditions. An outdoor microphone system was used which includes an anti-bird spikes, a windscreen and a rain cover. The time weighting of the meter was set to fast, and on-site calibration was carried out before each measurement and the calibration was checked immediately after. In all cases the analyser stayed within the correct range 94.0 dB(A) ± 0.2 dB(A)), as specified by the manufacturer. For weather conditions, see survey comments. (see Appendix E for calibration certificates).

Noise Measurement Results

Capita Real estate and infrastructure carried out three 3-hour surveys in July 2020 along the predicated route to the development scheme area (as shown on Drawing No. BFNR-CAP-00-XX-DR-A-0002).

The results are summarised in the tables shown overleaf.

Location 1: Free Field Survey, A48 Nr Bridge – $L_{AF10\ 18\ hour}$ (CRTN)

Hour	Minutes	LAF10, 15min	LAF10, Hourly Mean
10:00	:15	76.2	76.2
	:30	75.9	
	:45	76.3	
	:00	76.4	
11:00	:15	76.2	76.4
	:30	76.4	
	:45	76.5	
	:00	76.2	
12:00	:15	76.3	76.4
	:30	76.4	
	:45	76.5	
	:00	76.3	

14/07/2020
LAF10,3-hour (dB) **75.3***

Windspeed 0.4/0.6
Weather Cloudy / Dry

*Please note that in accordance with the shortened measurement procedure (3-hour Survey)
1 dB(A) has to be deducted from the averaged 3-hour result, in this case 76.3 will become 75.3

Location 2: Free Field Survey, A48 Mt. Pleasant – $L_{AF10\ 18\ hour}$ (CRTN)

Hour	Minutes	LAF10, 15min	LAF10, Hourly Mean
13:30	:45	76.7	77.0
	:00	76.8	
	:15	77.4	
	:30	77.1	
14:30	:45	76.6	76.8
	:00	77.1	
	:15	77.0	
	:30	76.7	
15:30	:45	77.0	77.1
	:00	77.1	
	:15	76.9	
	:30	77.4	

14/07/2020
LAF10,3-hour (dB) **76.0***

Windspeed 0.6/0.8
Weather Cloudy / Dry

*Please note that in accordance with the shortened measurement procedure (3-hour Survey)
1 dB(A) has to be deducted from the averaged 3-hour result, in this case 77.0 will become 76.0

Location 3: Free Field Survey, A48 Pwllmeyric – $L_{AF10\ 18\ hour}$ (CRTN)

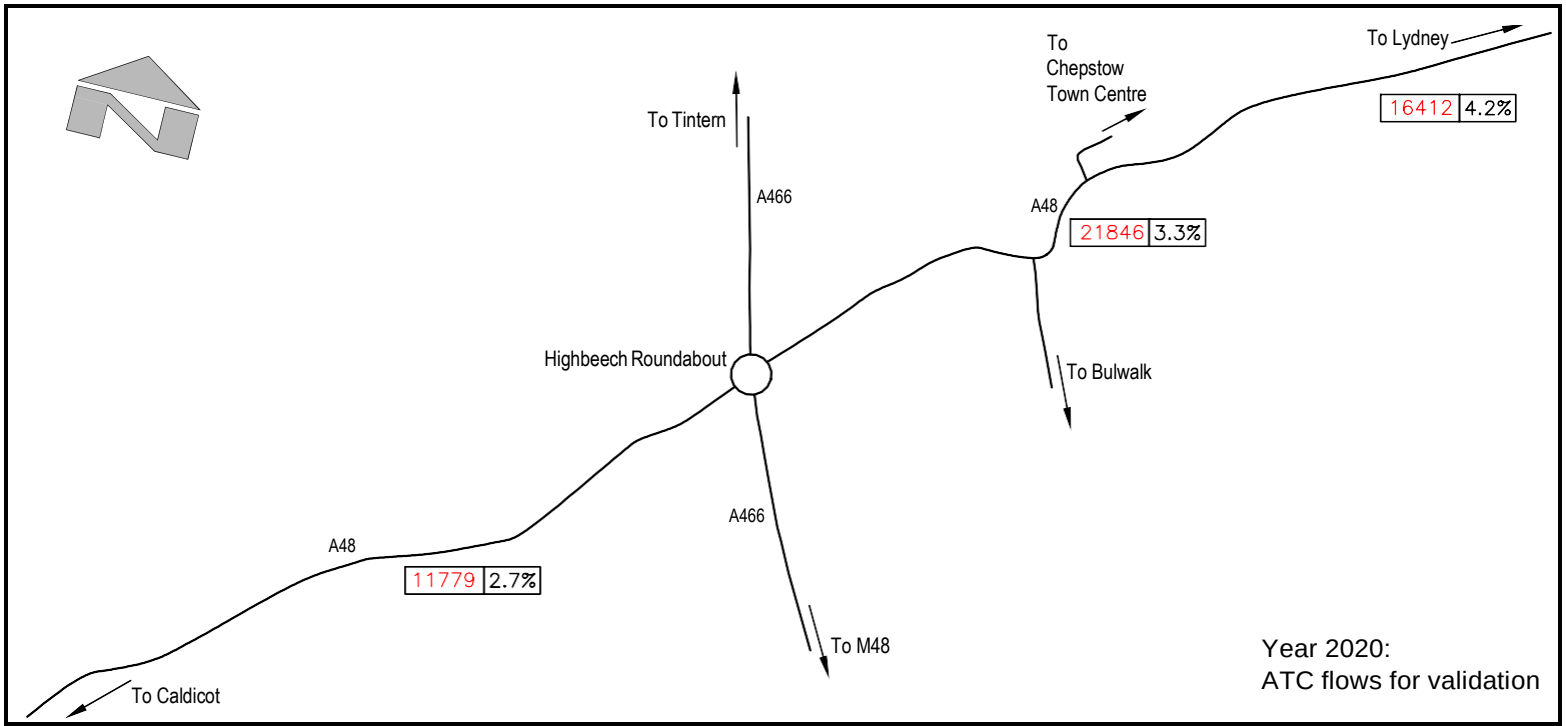
Hour	Minutes	LAF10, 15min	LAF10, Hourly Mean
10:00	:15	74.4	74.8
	:30	74.9	
	:45	75.1	
	:00	74.9	
11:00	:15	75.0	75.1
	:30	75.2	
	:45	75.1	
	:00	75.2	
12:00	:15	75.2	75.4
	:30	75.8	
	:45	75.8	
	:00	74.8	

15/07/2020
LAF10,3-hour (dB) **74.1***

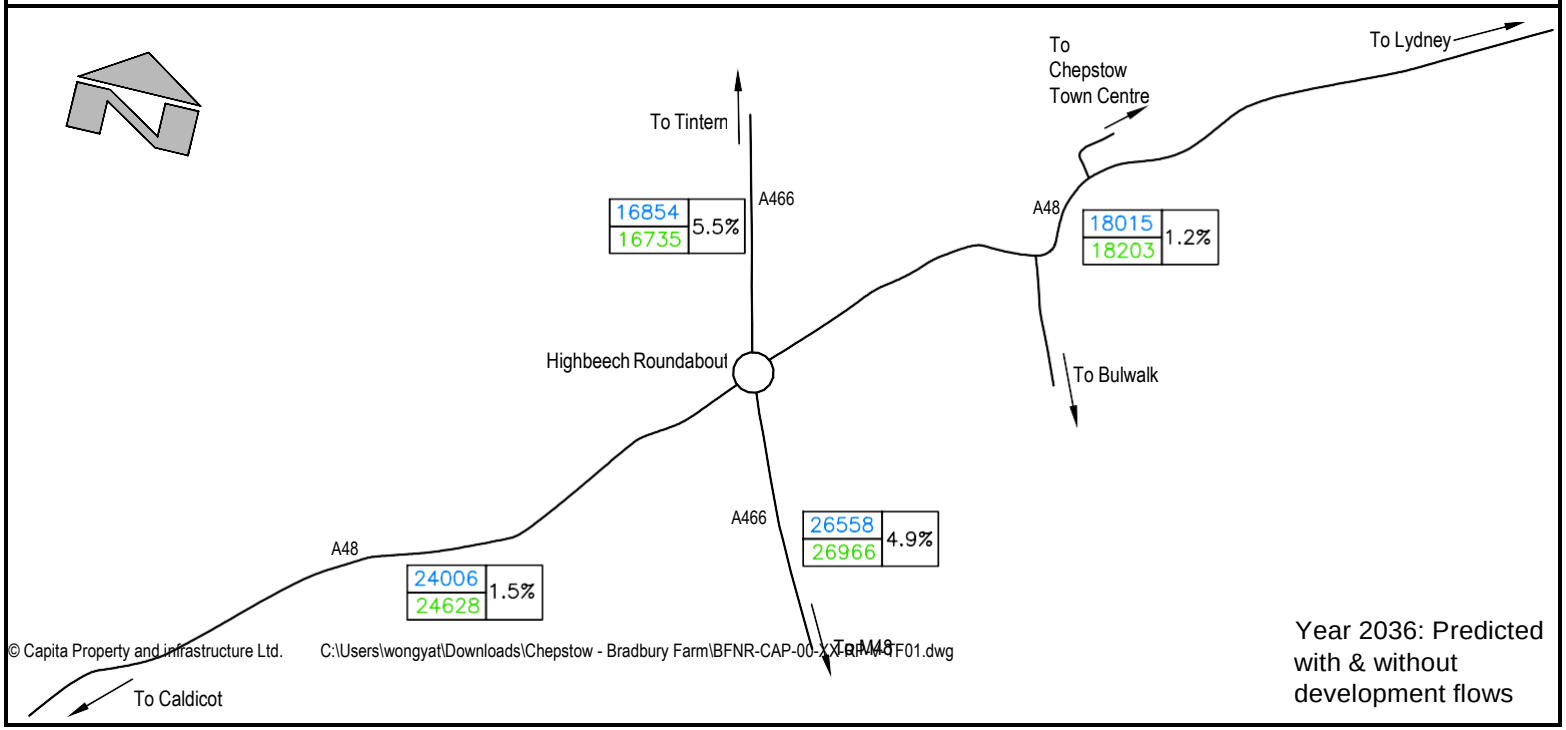
Windspeed 0.6/0.8
Weather Cloudy / Dry

*Please note that in accordance with the shortened measurement procedure (3-hour Survey)
1 dB(A) has to be deducted from the averaged 3-hour result, in this case 75.1 will become 74.1

Appendix C
Traffic Flow Diagram



Year 2020:
ATC flows for validation



Year 2036: Predicted with & without development flows

Key:

16412	YEAR 2020 (ATC flows)
18015	YEAR 2036 without development (predicated flows)
18203	YEAR 2036 with development (predicated flows)
1.5%	HGV %

Rev	Dwn	Chk'd	App'd	Description	Date

Purpose of Issue
S2 - Suitable for information

Classification
Confidence : Public/Low sensitivity

Client
Cyngor monmouthshire County Council sir fynwy

Project
A48(T) Chepstow
Bradbury Farm TA
Ambient Noise Assessment Report

Drawing
Traffic Flow Diagram
Do Minimum & Do Something flows

Scale @ A4	Drawn	Checked	Approved
1:15,000	YKW	GBW	GBW

Project No.	Date
CS/100155	19/10/2020

Drawing Identifier — BS1192 Compliant
Project - Originator - Zone - Level - File Type - Role - Number — rev
BFNR-CAP-00-XX-RP-V-TF01 — P01

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Capita Property and infrastructure Ltd.

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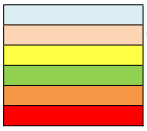
Print Date:03/11/2020 10:55:38

Appendix D
Noise Schedule

NOISE SCHEDULE 1
A48 PWLLMEYRIC AND A48 CHEPSTOW
NOISE INSULATION (AMENDMENT) REGULATIONS 1988
CALCULATED NOISE LEVELS

KEY:



NOTE:

1dB	- No Noticeable Change
3dB	- Noticeable Difference
5dB	- Clearly Noticeable Difference
10dB	- Up to a Doubling of Perceived Loudness
>10dB	- Over a Doubling of Perceived Loudness

(Above information taken from Institute of Acoustics documentation)

Schedule 1
NOISE INSULATION (AMENDMENT) REGULATIONS 1988
CALCULATED NOISE LEVELS

NO	PROPERTY	FAÇADE	FLOOR	CALCULATED L10 NOISE LEVELS		2036 DS minus 2036 DM
				2036 DO MINIMUM	2036 DO SOMETHING	
9a	Beech Grove	NW	Ground	61.5	61.6	0.1
-	WhippleTtrees, St. Lawrence Road	SW	Ground	60.6	60.6	0.0
-	WhippleTtrees, St. Lawrence Road	SW	First	62.7	62.7	0.0
-	Marchwood, St. Lawrence Road	SE	Ground	64.4	64.5	0.1
-	Marchwood, St. Lawrence Road	SE	First	67.6	67.7	0.1
-	Sunflower House, Newport Road	NW	Ground	61.4	61.4	0.0
-	Sunflower House, Newport Road	NW	First	63.8	63.8	0.0
-	Beechcroft, Newport Road	NW	Ground	62.2	62.3	0.1
-	Beechcroft, Newport Road	NW	First	64.5	64.5	0.0
-	Oakfield Bungalow, Newport Road	NW	Ground	64.6	64.7	0.1
1	Newport Road	SE	Ground	63.1	63.2	0.1
1	Newport Road	SE	First	65.0	65.1	0.1
2	Newport Road	SE	Ground	59.9	60.0	0.1
2	Newport Road	SE	First	61.9	62.0	0.1
3	Newport Road	SE	Ground	65.4	65.5	0.1
3	Newport Road	SE	First	67.0	67.1	0.1
4	Newport Road	SE	Ground	64.6	64.7	0.1
4	Newport Road	SE	First	66.7	66.8	0.1
5	Newport Road	SE	Ground	66.4	66.5	0.1
5	Newport Road	SE	First	67.7	67.8	0.1
6	Newport Road	SE	Ground	66.1	66.2	0.1
6	Newport Road	SE	First	67.6	67.7	0.1
7	Newport Road	SE	Ground	69.1	69.2	0.1
7	Newport Road	SE	First	69.2	69.3	0.1
8	Newport Road	SE	Ground	68.8	68.9	0.1
8	Newport Road	SE	First	69.5	69.6	0.1
9	Newport Road	SE	Ground	69.1	69.2	0.1
9	Newport Road	SE	First	69.4	69.5	0.1
10	Newport Road	SE	Ground	68.9	69.0	0.1
10	Newport Road	SE	First	69.5	69.6	0.1
11	Newport Road	SE	Ground	68.4	68.5	0.1
11	Newport Road	SE	First	69.2	69.3	0.1
-	Kimberley, Newport Road	SE	Ground	67.2	67.3	0.1
-	Kimberley, Newport Road	SE	First	69.4	69.5	0.1
40	Mounton Drive	SE	Ground	59.0	59.1	0.1
40	Mounton Drive	SE	First	60.8	60.9	0.1
35	Larkfield Park	SW	Ground	50.9	50.9	0.0
35	Larkfield Park	SW	First	54.0	54.0	0.0
36	Larkfield Park	SW	Ground	51.8	51.8	0.0
36	Larkfield Park	SW	First	54.8	54.8	0.0
37	Larkfield Park	SW	Ground	52.9	53.0	0.1
37	Larkfield Park	SW	First	56.0	56.1	0.1
38	Larkfield Park	SW	Ground	63.0	63.1	0.1
38	Larkfield Park	SW	First	69.2	69.3	0.1
39	Larkfield Park	NW	Ground	60.7	60.8	0.1
39	Larkfield Park	NW	First	66.1	66.2	0.1
10	Larkfield Park	NW	Ground	61.8	61.9	0.1
10	Larkfield Park	NW	First	67.0	67.1	0.1
41-46	Larkfield Park	NW	Ground	61.9	62.0	0.1
41-46	Larkfield Park	NW	First	66.3	66.4	0.1
-	Larkfield House 1, Larkfield Park	NW	Ground	71.6	71.7	0.1
-	Larkfield House 1, Larkfield Park	NW	First	71.7	71.8	0.1
-	Larkfield House 2, Larkfield Park	NW	Ground	71.5	71.6	0.1
-	Larkfield House 2, Larkfield Park	NW	First	71.7	71.8	0.1
3	Larkfield Grove	NW	Ground	66.2	66.3	0.1
3	Larkfield Grove	NW	First	69.1	69.2	0.1
4	Larkfield Grove	NW	Ground	62.8	62.9	0.1
4	Larkfield Grove	NW	First	66.1	66.2	0.1
5	Larkfield Grove	NW	Ground	67.0	67.1	0.1
5	Larkfield Grove	NW	First	69.3	69.4	0.1
6	Larkfield Grove	NW	Ground	64.1	64.2	0.1
6	Larkfield Grove	NW	First	68.3	68.4	0.1
-	Silure House, Hardwick Hill	NW	Ground	62.9	63.0	0.1
-	Silure House, Hardwick Hill	NW	First	66.5	66.6	0.1
-	Silure House, Hardwick Hill	NW	Second	67.7	67.8	0.1
-	Lai See, Hardwick Hill	NW	Ground	61.8	61.9	0.1
-	Larklea, Hardwick Hill	NW	Ground	66.1	66.2	0.1
-	Larklea, Hardwick Hill	NW	First	68.9	69.0	0.1
-	River Lodge, Hardwick Hill	NW	Ground	68.8	68.9	0.1
1	Hardwick Hill House	N	Ground	73.3	73.4	0.1
1	Hardwick Hill House	N	First	72.7	72.8	0.1
1	Hardwick Hill House	N	Second	72.1	72.2	0.1
2	Hardwick Hill House	N	Ground	73.8	73.9	0.1
2	Hardwick Hill House	N	First	73.3	73.4	0.1
2	Hardwick Hill House	N	Second	72.6	72.7	0.1
3	Hardwick Hill House	W	Ground	70.5	70.6	0.1
3	Hardwick Hill House	W	First	71.8	71.9	0.1
3	Hardwick Hill House	W	Second	71.4	71.5	0.1
4	Hardwick Hill House	W	Ground	66.1	66.2	0.1
4	Hardwick Hill House	W	First	67.8	67.9	0.1
4	Hardwick Hill House		Second	68.2	68.3	0.1

Schedule 1
NOISE INSULATION (AMENDMENT) REGULATIONS 1988
CALCULATED NOISE LEVELS

NO	PROPERTY	FAÇADE	FLOOR	CALCULATED L10 NOISE LEVELS		2036 DS minus 2036 DM
				2036 DO MINIMUM	2036 DO SOMETHING	
-	Orchard House, Hardwick Hill	W	Ground	65.7	65.8	0.1
-	Orchard House, Hardwick Hill	N	First	73.1	73.2	0.1
-	Ashcroft, Hardwick Hill	N	Ground	60.3	60.4	0.1
-	Ashcroft, Hardwick Hill	SE	First	63.4	63.5	0.1
-	Ashcroft Mews, Hardwick Hill	SE	Ground	61.7	61.8	0.1
-	Ashcroft Mews, Hardwick Hill	SE	First	64.5	64.6	0.1
-	Rosemant, Hardwick Hill	SE	Ground	69.8	69.9	0.1
-	Rosemant, Hardwick Hill	SE	First	71.1	71.2	0.1
-	Hill Side, Hardwick Hill	SE	Ground	68.8	68.9	0.1
-	Hill Side, Hardwick Hill	SE	First	70.5	70.6	0.1
-	Way Side, Hardwick Hill	SE	Ground	68.8	68.9	0.1
-	Way Side, Hardwick Hill	SE	First	70.0	70.1	0.1
-	Cranley, Hardwick Hill	SE	Ground	61.1	61.2	0.1
-	Cranley, Hardwick Hill	SE	First	64.5	64.6	0.1
-	Glanmor, Hardwick Hill	SE	Ground	59.9	60.0	0.1
-	Apeldoom, Hardwick Hill Lane	SE	Ground	57.8	57.9	0.1
-	Alwyn, Hardwick Hill Lane	SE	Ground	56.6	56.7	0.1
-	Hafan, Hardwick Hill Lane	SE	Ground	56.4	56.5	0.1
-	Harvax, Hardwick Hill Lane	SE	Ground	59.9	60.0	0.1
-	Harvax, Hardwick Hill Lane	SW	First	65.1	65.2	0.1
-	Envy, Hardwick Hill Lane	SW	Ground	62.4	62.5	0.1
-	Envy, Hardwick Hill Lane	SW	First	69.8	69.9	0.1
-	Lower Hardwick, Mount Pleasant	SW	Ground	61.9	62.0	0.1
-	Lower Hardwick, Mount Pleasant	S	First	68.8	68.9	0.1
-	Lower Hardwick, Mount Pleasant	S	Second	71.1	71.2	0.1
-	The Dingle, Mount Pleasant	S	Ground	71.5	71.5	0.0
-	The Dingle, Mount Pleasant	E	First	71.7	71.7	0.0
-	Dingleside, Mount Pleasant	E	Ground	71.2	71.2	0.0
-	Dingleside, Mount Pleasant	E	First	71.2	71.2	0.0
-	Mount Pleasant House, Mount Pleasant	E	Ground	63.4	63.4	0.0
-	Mount Pleasant House, Mount Pleasant	E	First	69.8	69.8	0.0
-	Ashfield, Mount Pleasant	E	Ground	68.2	68.2	0.0
-	Ashfield, Mount Pleasant	N	First	70.4	70.4	0.0
-	Grosmont, Mount Pleasant	N	Ground	75.1	75.1	0.0
-	Grosmont, Mount Pleasant	W	First	75.8	75.8	0.0
-	Lambourn, Mount Pleasant	W	Ground	72.8	72.8	0.0
-	Lambourn, Mount Pleasant	W	First	74.2	74.2	0.0
-	Sunnyside, Mount Pleasant	W	Ground	74.1	74.1	0.0
-	Sunnyside, Mount Pleasant	W	First	75.1	75.1	0.0
-	Hill House, Mount Pleasant	W	Ground	75.6	75.6	0.0
-	Hill House, Mount Pleasant	W	First	75.6	75.6	0.0
-	Ashleigh, Rockwood Road	W	Ground	58.0	58.0	0.0
-	Ashleigh, Rockwood Road	W	First	62.0	62.0	0.0
-	Riverview, Steeps Street	W	Ground	66.9	66.9	0.0
-	Riverview, Steeps Street	E	First	69.2	69.2	0.0
-	The Firs, Steeps Street	E	Ground	65.6	65.6	0.0
-	The Firs, Steeps Street	E	First	69.1	69.1	0.0
1	Steeps Street	E	Ground	60.1	60.1	0.0
1	Steeps Street	E	First	62.0	62.0	0.0
2	Steeps Street	E	Ground	63.6	63.6	0.0
2	Steeps Street	E	First	64.8	64.8	0.0
2	Steeps Street	E	Second	65.6	65.6	0.0
3	Steeps Street	E	Ground	64.2	64.2	0.0
3	Steeps Street	E	First	65.6	65.6	0.0
3	Steeps Street	E	Second	66.3	66.3	0.0
4	Steeps Street	E	Ground	65.0	65.0	0.0
4	Steeps Street	E	First	66.2	66.2	0.0
4	Steeps Street	E	Second	66.8	66.8	0.0
5	Steeps Street	E	Ground	64.7	64.7	0.0
5	Steeps Street	E	First	66.3	66.3	0.0
5	Steeps Street	E	Second	67.0	67.0	0.0
6	Steeps Street	E	Ground	66.6	66.6	0.0
6	Steeps Street	E	First	67.2	67.2	0.0
6	Steeps Street	E	Second	67.5	67.5	0.0
7	Steeps Street	E	Ground	66.2	66.2	0.0
7	Steeps Street	E	First	67.0	67.0	0.0
7	Steeps Street	E	Second	67.4	67.4	0.0
8	Steeps Street	E	Ground	66.1	66.1	0.0
8	Steeps Street	E	First	66.9	66.9	0.0
8	Steeps Street	E	Second	67.1	67.1	0.0
9	Steeps Street	E	Ground	64.9	64.9	0.0
9	Steeps Street	E	First	66.1	66.1	0.0
9	Steeps Street	E	Second	66.7	66.7	0.0
10	Steeps Street	E	Ground	64.5	64.5	0.0
10	Steeps Street	E	First	65.7	65.7	0.0
10	Steeps Street	E	Second	66.5	66.5	0.0
1	Hardwick Terrace	E	Ground	58.5	58.5	0.0
1	Hardwick Terrace	SW	First	60.7	60.7	0.0
1	Hardwick Terrace	SW	Second	62.1	62.1	0.0

Schedule 1
NOISE INSULATION (AMENDMENT) REGULATIONS 1988
CALCULATED NOISE LEVELS

NO	PROPERTY	FAÇADE	FLOOR	CALCULATED L10 NOISE LEVELS		2036 DS minus 2036 DM
				2036 DO MINIMUM	2036 DO SOMETHING	
2	Hardwick Terrace	SW	Ground	60.4	60.4	0.0
2	Hardwick Terrace	SW	First	62.5	62.5	0.0
2	Hardwick Terrace	SW	Second	63.7	63.7	0.0
3	Hardwick Terrace	SW	Ground	62.8	62.8	0.0
3	Hardwick Terrace	SW	First	64.8	64.8	0.0
4	Hardwick Terrace	SW	Ground	66.3	66.3	0.0
4	Hardwick Terrace	SW	First	68.1	68.1	0.0
2	Hardwick Avenue	SW	Ground	60.1	60.1	0.0
2	Hardwick Avenue	SW	First	61.3	61.3	0.0
5	Hardwick Avenue	SW	Ground	68.2	68.2	0.0
5	Hardwick Avenue	SW	First	71.7	71.7	0.0
5	Hardwick Avenue	SW	Second	71.9	71.9	0.0
7	Hardwick Avenue	SW	Ground	66.1	66.1	0.0
7	Hardwick Avenue	SW	First	68.6	68.6	0.0
7	Hardwick Avenue	SW	Second	69.3	69.3	0.0
9	Hardwick Avenue	SW	Ground	64.6	64.6	0.0
9	Hardwick Avenue	SW	First	66.7	66.7	0.0
9	Hardwick Avenue	SW	Second	67.9	67.9	0.0
11	Hardwick Avenue	SW	Ground	63.3	63.3	0.0
11	Hardwick Avenue	SW	First	65.1	65.1	0.0
11	Hardwick Avenue	SW	Second	66.3	66.3	0.0
13	Hardwick Avenue	SW	Ground	62.0	62.0	0.0
13	Hardwick Avenue	SW	First	63.6	63.6	0.0
13	Hardwick Avenue	SW	Second	64.6	64.6	0.0
-	Restway Wall 1, Garden City Way	N	Ground	69.0	69.0	0.0
-	Restway Wall 1, Garden City Way	N	First	70.4	70.4	0.0
-	Restway Wall 1, Garden City Way	N	Second	70.4	70.4	0.0
-	Restway Wall 2, Garden City Way	N	Ground	69.0	69.0	0.0
-	Restway Wall 2, Garden City Way	N	First	70.6	70.6	0.0
-	Restway Wall 2, Garden City Way	N	Second	70.8	70.8	0.0
3	Moor Street	SE	Ground	54.2	54.2	0.0
3	Moor Street	SE	First	57.9	57.9	0.0
3	Moor Street	SE	Second	60.6	60.6	0.0
4	Moor Street	SE	Ground	54.3	54.3	0.0
4	Moor Street	SE	First	57.3	57.3	0.0
4	Moor Street	SE	Second	60.2	60.2	0.0
5	Moor Street	SE	Ground	54.3	54.3	0.0
5	Moor Street	SE	First	57.1	57.1	0.0
5	Moor Street	SE	Second	60.0	60.0	0.0
6	Moor Street	SE	Ground	53.3	53.3	0.0
6	Moor Street	SE	First	57.1	57.1	0.0
6	Moor Street	SE	Second	59.9	59.9	0.0
7	Moor Street	SE	Ground	52.9	52.9	0.0
7	Moor Street	SE	First	57.6	57.6	0.0
7	Moor Street	SE	Second	60.0	60.0	0.0
8	Moor Street	SE	Ground	51.5	51.5	0.0
8	Moor Street	SE	First	55.9	55.9	0.0
8	Moor Street	SE	Second	58.6	58.6	0.0
16-17	School Hill	SW	Ground	67.3	67.3	0.0
16-17	School Hill	SW	First	68.5	68.5	0.0
18-19	School Hill	SW	Ground	67.8	67.8	0.0
18-19	School Hill	SW	First	68.7	68.7	0.0
20	School Hill	SW	Ground	65.3	65.3	0.0
20	School Hill	SW	First	68.6	68.6	0.0
20	School Hill	SW	Second	69.3	69.3	0.0
20	School Hill	SW	Third	69.2	69.2	0.0
21	School Hill	SW	Ground	65.3	65.3	0.0
21	School Hill	SW	First	69.0	69.0	0.0
21	School Hill	SW	Second	69.7	69.7	0.0
22	School Hill	SW	Ground	66.2	66.2	0.0
22	School Hill	SW	First	69.5	69.5	0.0
23	School Hill	SW	Ground	67.6	67.6	0.0
23	School Hill	SW	First	70.0	70.0	0.0
24	School Hill	SW	Ground	66.4	66.4	0.0
24	School Hill	SW	First	69.8	69.8	0.0
25	School Hill	SW	Ground	67.9	67.9	0.0
25	School Hill	SW	First	69.9	69.9	0.0
25	School Hill	SW	Second	70.4	70.4	0.0
26	School Hill	SW	Ground	67.7	67.7	0.0
26	School Hill	SW	First	69.6	69.6	0.0
26	School Hill	SW	Second	70.1	70.1	0.0
27	School Hill	SW	Ground	67.6	67.6	0.0
27	School Hill	SW	First	69.8	69.8	0.0
28	School Hill	SW	Ground	67.6	67.6	0.0
28	School Hill	SW	First	69.5	69.5	0.0
29	School Hill	SW	Ground	67.6	67.6	0.0
29	School Hill	SW	First	69.3	69.3	0.0
1	Oxford Street	SW	Ground	56.0	56.0	0.0
1	Oxford Street	SW	First	58.1	58.1	0.0
2	Oxford Street	SW	Ground	57.5	57.5	0.0
2	Oxford Street		First	59.6	59.6	0.0

Schedule 1
NOISE INSULATION (AMENDMENT) REGULATIONS 1988
CALCULATED NOISE LEVELS

NO	PROPERTY	FAÇADE	FLOOR	CALCULATED L10 NOISE LEVELS		2036 DS minus 2036 DM
				2036 DO MINIMUM	2036 DO SOMETHING	
3	Oxford Street	SW	Ground	59.5	59.5	0.0
3	Oxford Street	SW	First	61.4	61.4	0.0
4	Oxford Street	SW	Ground	63.3	63.3	0.0
4	Oxford Street	SW	First	64.7	64.7	0.0
4	Exemouth Place	SW	Ground	58.4	58.4	0.0
4	Exemouth Place	NE	First	60.0	60.0	0.0
5	Exemouth Place	NE	Ground	59.9	59.9	0.0
5	Exemouth Place	NE	First	61.5	61.5	0.0
6	Exemouth Place	NE	Ground	61.2	61.2	0.0
6	Exemouth Place	NE	First	62.8	62.8	0.0
7	Exemouth Place	NE	Ground	62.8	62.8	0.0
7	Exemouth Place	NE	First	64.7	64.7	0.0
1	Nelson Street	NE	Ground	65.1	65.1	0.0
1	Nelson Street	SE	First	66.4	66.4	0.0
1	Nelson Street	SE	Second	67.2	67.2	0.0
2	Nelson Street	SE	Ground	64.8	64.8	0.0
2	Nelson Street	SE	First	66.1	66.1	0.0
2	Nelson Street	SE	Second	66.9	66.9	0.0
5	Nelson Street	SE	Ground	63.1	63.1	0.0
5	Nelson Street	SE	First	64.5	64.5	0.0
5	Nelson Street	SE	Second	65.2	65.2	0.0
6	Nelson Street	SE	Ground	63.3	63.3	0.0
6	Nelson Street	SE	First	64.9	64.9	0.0
6	Nelson Street	SE	Second	65.7	65.7	0.0
7	Nelson Street	SE	Ground	63.9	63.9	0.0
7	Nelson Street	SE	First	65.4	65.4	0.0
7	Nelson Street	SE	Second	66.3	66.3	0.0
1	Church Row	SE	Ground	55.3	55.3	0.0
1	Church Row	SE	First	56.6	56.6	0.0
2	Church Row	SE	Ground	55.1	55.1	0.0
2	Church Row	SE	First	56.4	56.4	0.0
3	Church Row	SE	Ground	54.9	54.9	0.0
3	Church Row	SE	First	56.2	56.2	0.0
4	Church Row	SE	Ground	54.8	54.8	0.0
4	Church Row	SE	First	56.1	56.1	0.0
5	Church Row	SE	Ground	54.7	54.7	0.0
5	Church Row	SE	First	55.9	55.9	0.0
6	Church Row	SE	Ground	54.6	54.6	0.0
6	Church Row	SE	First	55.8	55.8	0.0
7	Church Row	SE	Ground	54.0	54.0	0.0
7	Church Row	SE	First	55.2	55.2	0.0
1	Myrtle Place	SE	Ground	56.3	56.3	0.0
1	Myrtle Place	NE	First	56.8	56.8	0.0
2	Myrtle Place	NE	Ground	56.6	56.6	0.0
2	Myrtle Place	NE	First	57.2	57.2	0.0
3	Myrtle Place	NE	Ground	57.4	57.4	0.0
3	Myrtle Place	NE	First	57.9	57.9	0.0
4	Myrtle Place	NE	Ground	58.6	58.6	0.0
4	Myrtle Place	NE	First	59.1	59.1	0.0
-	Myrtle Villa, Myrtle Place	NE	Ground	61.9	61.9	0.0
-	Myrtle Villa, Myrtle Place	NE	First	62.8	62.8	0.0
3	Kendall Square	NE	Ground	56.7	56.7	0.0
3	Kendall Square	SE	First	57.3	57.3	0.0
4	Kendall Square	SE	Ground	57.1	57.1	0.0
4	Kendall Square	SE	First	57.7	57.7	0.0
5	Kendall Square	SE	Ground	57.4	57.4	0.0
5	Kendall Square	SE	First	57.9	57.9	0.0
-	Hope Cottage, Lower Church Street	SE	Ground	56.4	56.4	0.0
-	Hope Cottage, Lower Church Street	SE	First	57.6	57.6	0.0
7	Lower Church Street	SE	Ground	57.3	57.3	0.0
7	Lower Church Street	SE	First	57.9	57.9	0.0
8	Lower Church Street	SE	Ground	55.7	55.7	0.0
8	Lower Church Street	SE	First	56.2	56.2	0.0
8	Lower Church Street	SE	Second	57.0	57.0	0.0
9	Lower Church Street	SE	Ground	56.4	56.4	0.0
9	Lower Church Street	SE	First	56.9	56.9	0.0
9	Lower Church Street	SE	Second	57.4	57.4	0.0
10	Lower Church Street	SE	Ground	56.5	56.5	0.0
10	Lower Church Street	SE	First	57.0	57.0	0.0
10	Lower Church Street	SE	Second	57.5	57.5	0.0
11	Lower Church Street	SE	Ground	56.6	56.6	0.0
11	Lower Church Street	SE	First	57.1	57.1	0.0
12	Lower Church Street	SE	Ground	56.7	56.7	0.0
12	Lower Church Street	SE	First	57.1	57.1	0.0
12A	Lower Church Street	SE	Ground	56.2	56.2	0.0
12A	Lower Church Street	SE	First	56.7	56.7	0.0
12A	Lower Church Street	SE	Second	57.2	57.2	0.0
13	Lower Church Street	SE	Ground	56.2	56.2	0.0
13	Lower Church Street	SE	First	56.7	56.7	0.0
13	Lower Church Street	SE	Second	57.1	57.1	0.0

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NO	PROPERTY	FAÇADE	FLOOR	CALCULATED L10 NOISE LEVELS		2036 DS minus 2036 DM
				2036 DO MINIMUM	2036 DO SOMETHING	
14	Lower Church Street	SE	Ground	56.2	56.2	0.0
14	Lower Church Street	SE	First	56.6	56.6	0.0
14	Lower Church Street	SE	Second	57.1	57.1	0.0
15	Lower Church Street	SE	Ground	55.8	55.8	0.0
15	Lower Church Street	SE	First	56.2	56.2	0.0
15	Lower Church Street	SE	Second	56.7	56.7	0.0
16	Lower Church Street	SE	Ground	55.6	55.6	0.0
16	Lower Church Street	SE	First	56.0	56.0	0.0
16	Lower Church Street	SE	Second	56.5	56.5	0.0
17	Lower Church Street	SE	Ground	55.4	55.4	0.0
17	Lower Church Street	SE	First	55.8	55.8	0.0
17	Lower Church Street	SE	Second	56.3	56.3	0.0
18	Lower Church Street	SE	Ground	55.1	55.1	0.0
18	Lower Church Street	SE	First	55.5	55.5	0.0
19	Lower Church Street	SE	Ground	54.8	54.8	0.0
19	Lower Church Street	SE	First	55.3	55.3	0.0
-	Picton House, Lower Church Street	SE	Ground	53.9	53.9	0.0
-	Picton House, Lower Church Street	SE	First	54.4	54.4	0.0
-	Wye Apartments, Severn Quay	SE	Ground	59.6	59.6	0.0
-	Wye Apartments, Severn Quay	SE	First	60.4	60.4	0.0
-	Wye Apartments, Severn Quay	SE	Second	60.9	60.9	0.0
-	Wye Apartments, Severn Quay	SE	Third	61.4	61.4	0.0
-	Highbeech Lodge, Newport Road	SE	Ground	68.9	69.0	0.1
-	Highbeech Lodge, Newport Road	NW	First	72.9	73.0	0.1
-	High Beech Farm, High Beech Road	NW	Ground	69.0	69.1	0.1
-	High Beech Farm, High Beech Road	NW	First	71.2	71.3	0.1
-	Wyelands Lodge, Pwllmeyric	NW	Ground	68.3	68.4	0.1
-	Laburnum Cottage, Pwllmeyric	N	Ground	71.0	71.1	0.1
-	Laburnum Cottage, Pwllmeyric	N	First	73.8	73.9	0.1
-	Little Meadow, Pwllmeyric	N	Ground	66.8	66.9	0.1
1	Oak Bluff, Pwllmeyric	N	Ground	74.9	75.0	0.1
1	Oak Bluff, Pwllmeyric	N	First	76.2	76.3	0.1
2	Oak Bluff, Pwllmeyric	N	Ground	74.5	74.6	0.1
2	Oak Bluff, Pwllmeyric	N	First	75.8	75.9	0.1
-	Penaga, Pwllmeyric	N	Ground	75.2	75.3	0.1
-	Penaga, Pwllmeyric	N	First	76.4	76.5	0.1
-	Mopla, Pwllmeyric	N	Ground	77.3	77.4	0.1
-	Mopla, Pwllmeyric	N	First	77.2	77.3	0.1
-	Trelenny View, Pwllmeyric	N	Ground	68.6	68.7	0.1
-	Trelenny View, Pwllmeyric	N	First	73.8	73.9	0.1
-	St. Anthonys, Pwllmeyric	N	Ground	65.1	65.2	0.1
-	St. Anthonys, Pwllmeyric	NW	First	69.7	69.8	0.1
-	Mayhill, Pwllmeyric	NW	Ground	64.7	64.8	0.1
-	Mayhill, Pwllmeyric	NW	First	68.9	69.0	0.1
-	The Rowans, Pwllemyric	NW	Ground	58.5	58.6	0.1
-	The Rowans, Pwllemyric	S	First	61.3	61.4	0.1
1	The Chestnuts, Pwllemyric	S	Ground	64.4	64.5	0.1
1	The Chestnuts, Pwllemyric	S	First	66.6	66.7	0.1
2	The Chestnuts, Pwllemyric	S	Ground	67.9	68.0	0.1
2	The Chestnuts, Pwllemyric	S	First	69.8	69.9	0.1
-	Pwllemyric House, Pwllemyric	S	Ground	64.8	64.9	0.1
-	Pwllemyric House, Pwllemyric	S	First	70.4	70.5	0.1
-	Meyric, Pwllemyric	S	Ground	59.7	59.8	0.1
-	Meyric, Pwllemyric	SE	First	61.6	61.7	0.1
-	Hill Farm, Pwllemyric	SE	Ground	66.4	66.5	0.1
-	Hill Farm, Pwllemyric	S	First	67.8	67.9	0.1
-	The Cedars, Pwllmeyric	S	Ground	78.6	78.7	0.1
-	The Cedars, Pwllmeyric	SE	First	78.7	78.8	0.1
-	Silver Birch, Pwllmeyric	SE	Ground	67.3	67.4	0.1
-	Deauville House, Pwllmeyric	NW	Ground	66.0	66.1	0.1
-	Deauville House, Pwllmeyric	N	First	70.5	70.6	0.1
-	Pwllmeyric House, Pwllmeyric	N	Ground	69.3	69.4	0.1
-	Pwllmeyric House, Pwllmeyric	NW	First	75.3	75.4	0.1
-	Pwllmeyric Lodge, Pwllmeyric	NW	Ground	55.9	56.0	0.1
-	Pwllmeyric Lodge, Pwllmeyric	SW	First	57.6	57.7	0.1
-	The Cottage, Pwllmeyric	SW	Ground	66.9	67.0	0.1
-	The Cottage, Pwllmeyric	SE	First	69.1	69.2	0.1
-	Rose Villa, Pwllmeyric	SE	Ground	69.9	70.0	0.1
-	Rose Villa, Pwllmeyric	SE	First	72.3	72.4	0.1
-	Hillside, Pwllmeyric	SE	Ground	65.8	65.9	0.1
-	Hillside, Pwllmeyric	SE	First	68.7	68.8	0.1
-	Priory Cottage, Pllmeyric	SE	Ground	66.0	66.1	0.1
-	Priory Cottage, Pllmeyric	NW	First	72.2	72.3	0.1
-	Meadwell, Pllmeyric	NW	Ground	66.3	66.4	0.1
-	Meadwell, Pllmeyric	NW	First	70.3	70.4	0.1
-	The Conifirs, Pllmeyric	NW	Ground	65.9	66.0	0.1
-	The Conifirs, Pllmeyric	NW	First	69.3	69.4	0.1
-	Berry Head Cottage, Pllmeyric	NW	Ground	72.4	72.5	0.1
-	Berry Head Cottage, Pllmeyric	NW	First	75.0	75.1	0.1
-	Russet Lodge, Pllmeyric	NW	Ground	68.3	68.4	0.1
-	Russet Lodge, Pllmeyric		First	71.6	71.7	0.1

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NO	PROPERTY	FAÇADE	FLOOR	CALCULATED L10 NOISE LEVELS		2036 DS minus 2036 DM
				2036 DO MINIMUM	2036 DO SOMETHING	
-	Bryn House, Pllmeyric	NW	Ground	76.6	76.7	0.1
-	Bryn House, Pllmeyric	NW	First	76.5	76.6	0.1
-	Llanover House, Pllmeyric	NW	Ground	77.2	77.3	0.1
-	Llanover House, Pllmeyric	NW	First	77.2	77.3	0.1
-	Bryn Cottage, Pllmeyric	NW	Ground	77.0	77.1	0.1
-	Bryn Cottage, Pllmeyric	NW	First	77.0	77.1	0.1
-	White Cottage, Pllmeyric	NW	Ground	77.1	77.2	0.1
-	White Cottage, Pllmeyric	NW	First	77.1	77.2	0.1
-	Yew Tree House, Pllmeyric	NW	Ground	70.8	70.9	0.1
-	Yew Tree House, Pllmeyric	NW	First	72.8	72.9	0.1
-	The Green, Pllmeyric	W	Ground	66.8	66.9	0.1
-	The Green, Pllmeyric	W	First	68.7	68.8	0.1
-	Rose Cottage, Pllmeyric	W	Ground	67.4	67.5	0.1
-	Rose Cottage, Pllmeyric	W	First	69.5	69.6	0.1
-	Fairways, Pllmeyric	NW	Ground	66.5	66.6	0.1
-	Fairways, Pllmeyric	NW	First	69.1	69.2	0.1
-	Greystone, Pllmeyric	NW	Ground	65.4	65.5	0.1
-	Wenvoe, Pllmeyric	NW	Ground	67.5	67.6	0.1
-	Bridge House, Pllmeyric	NW	Ground	75.5	75.6	0.1
-	Bridge House, Pllmeyric	NW	First	75.7	75.8	0.1
-	Beckstone House, Pllmeyric	NW	Ground	65.6	65.7	0.1
-	Beckstone House, Pllmeyric	NW	First	68.6	68.7	0.1
-	Hill House, Pllmeyric	NW	Ground	70.8	70.9	0.1
-	Hill House, Pllmeyric	NW	First	73.5	73.6	0.1
-	Brook Cottage, Pllmeyric	SW	Ground	70.0	70.1	0.1
-	Brook Cottage, Pllmeyric	SW	First	71.4	71.5	0.1
-	Box Tree Cottage, Pllmeyric	E	Ground	74.1	74.2	0.1
-	Box Tree Cottage, Pllmeyric	E	First	75.3	75.4	0.1
-	Willbrook House Annex, Pllmeyric	SE	Ground	72.4	72.5	0.1
-	Willbrook House, Pllmeyric	SE	Ground	74.8	74.9	0.1
-	Willbrook House, Pllmeyric	SE	First	75.9	76.0	0.1
-	Crofters Ash, Pentwyn Close	SE	Ground	54.2	54.3	0.1
-	Crofters Ash, Pentwyn Close	SE	First	55.8	55.9	0.1
-	Meadowside, Pentwyn Close	SW	Ground	55.0	55.1	0.1
-	Meadowside, Pentwyn Close	SW	First	57.2	57.3	0.1
-	Pentwyn House, Pentwyn Close	SE	Ground	55.7	55.8	0.1
-	Pentwyn House, Pentwyn Close	SE	First	57.9	58.0	0.1
-	The Hollies, Chapel Lane	SE	Ground	62.9	63.0	0.1
-	The Hollies, Chapel Lane	SE	First	65.1	65.2	0.1
-	Holly Cottage, Chapel Lane	SW	Ground	61.7	61.8	0.1
-	Holly Cottage, Chapel Lane	SW	First	63.8	63.9	0.1
-	Rose Cottage, Chapel Lane	SW	Ground	59.5	59.6	0.1
-	Rose Cottage, Chapel Lane	SW	First	61.7	61.8	0.1
1	Badgers Meadow	SW	Ground	57.6	57.7	0.1
1	Badgers Meadow	SW	First	60.0	60.1	0.1
2	Badgers Meadow	SW	Ground	61.4	61.5	0.1
2	Badgers Meadow	SW	First	64.0	64.1	0.1
1	Pwllmeyric Close	SE	Ground	61.7	61.8	0.1
2	Pwllmeyric Close	SE	Ground	60.3	60.4	0.1
2	Pwllmeyric Close	SE	First	61.6	61.7	0.1
3	Pwllmeyric Close	SE	Ground	61.7	61.8	0.1
3	Pwllmeyric Close	SE	First	63.4	63.5	0.1
4	Pwllmeyric Close	SE	Ground	64.3	64.4	0.1
4	Pwllmeyric Close	SE	First	65.8	65.9	0.1
4	Orchard Rise	SE	Ground	67.7	67.8	0.1
4	Orchard Rise	SE	First	72.6	72.7	0.1
-	Free Field Survey Location 1	NW	Ground	74.5	74.5	0.0
-	Free Field Survey Location 2	NW	Ground	76.8	76.9	0.1
-	Free Field Survey Location 3	-	Ground	73.0	73.0	0.0

Appendix E
Noise Calibration Certificates

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CERTIFICATE OF CALIBRATION

Date of Issue: 05 September 2010

Certificate Number: TCRT19/1697

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail' info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Ac0ustîcs Molse and vtbællon Ltd tradlng as ANV Maaaurement Systems

Approved Signatory

K. Mistry

Customer	Capita Property and Infrastructure St Davids House Pascal Close St Mettons Cardiff CF3 OLW
Order No.	4800408981
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identificætion

Manufacturer	*Inslmment*	*Type*	Serial /\/o. /*Version*
Rion	Sound Level Meter	NL-52	00943362
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	43378
Rion	Microphone	UC-59	07156
Rion	Calibrator	NC-74	34546649
	Calibrator adaptor type if applicable		NC-74-002

Performance Class	1
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2008 were used to perform the periodic tests.*
Type Approved to IEC 61672-1:2002	YES Approval Number 21.21 / 13.02
	If YES above there is publls an 's/›ce idolhue *SLM has successfully completed the applicable pattern evaluation* tests *of IEC 61672-2:2003*
Date Received	04 September 2019 ANV Job No. TRAC19/09399
Date Calibrated	05 September 2019

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	12 May 2017	TCRT17/1266	ANV Measurement Systems

CERTIFICATE OF CALIBRATION

Certificate Number **TCRT19/1697**

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42/NL-52
SLM instruction manual ref / icsue		11-03
SLM instruction manual source		Manufacturer
Internet download date if applicable		N/A
Case co rections available		Yes
Uncertainties of case corrections		Yes
Source of case data		Manufacturer
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data		Manufacturer
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections		Manufacturer
Total expanded uncertainties within the requirements of IEC 61072-1:2002		Yes
Specified or equivalent Calibrator		Specified
Customer or Lab Calibrator		Customers Calibrator
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		05 September 2010
Calibrator cert. number		TCRT19/1606
Calibrator cal cert issued by		ANV Measurement Systems
Calibrator SPL @ STP	04.01 dB	Calibration reference sound pressure level
Calibrator frequency	1001.48 HZ	Calibration check frequency
Reference level range	25 - 130 dB	

Accessories used or corrected for durinp calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was ueed between the SLM and the pre-amp.

En o enta cond o d ngt	Sta	End	
Temperature	23.00	23.37	± 0.30 °C
Humidity	46.7	46.6	± 3.00 %RH
Ambient Pressure	101.50	101.50	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	04.2	dB		Adjusted indicated level	94.0	dB)
The uncertainty of the associated calibrator supplied with the sound level meter z					0.10	dB)

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A dB	A Weighting
Uncertainty of the microphone installed seP generated noise z	N/A dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Wghtin g	A			C			Z		
	11.7	dB	UR	15.5	dB	UR	21.4	dB	UR
Uncertainty of the electrical self generated noise z							0.12	dB	

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. Tha uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by ISO.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of Izc g1672-3:2006 were carried out using an electrostatic actuator.

. ..... END

Calibrated by: B. Giles R 2

Additional Commente

None

CERTIFICATE OF CALIBRATION

Date of Issue: 05 September 2019

Certificate Number: TCRT19/1696

Issued by:
ANV Measurement Systems
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E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and 'vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	Capita Property and Infrastructure St Davids House Pascal Close St Mellons Cardiff CF3 OLW
Order No.	480040898(
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	instrument	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34546649

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	TRAC19/09399	
Date Received	04 September 2019	
Date Calibrated	05 September 2019	
Previous Certificate	*Dated*	**12 May 2017**
	Certificate No.	**TCRT17/1 265**
	Laboratory	**ANV Measurement Systems**

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

94.01 + 0.10 dB rel 20 pPa

Functional Tests and Observations

The frequency of the sound produced was	1001.48 Hz		0.13 Hz
The total distortion was	0.87 %	+	7.1 % of Reading

During the measurements environmental conditions were

Temperature	22	to	23	°C
Relative Humidity	43	to	50	%
Barometric Pressure	101.4	to	101.5	kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by the International Organisation for Standards (ISO).

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

END

Note:

Calibrator adjusted prior to calibration?	YES	
Initial Level	93.94	dB
Initial Frequency	1001.52	Hz

Additional Comments

None

Calibrated by: B. Giles

Appendix F
Noise Contour Plans

CS/100155/NC/01

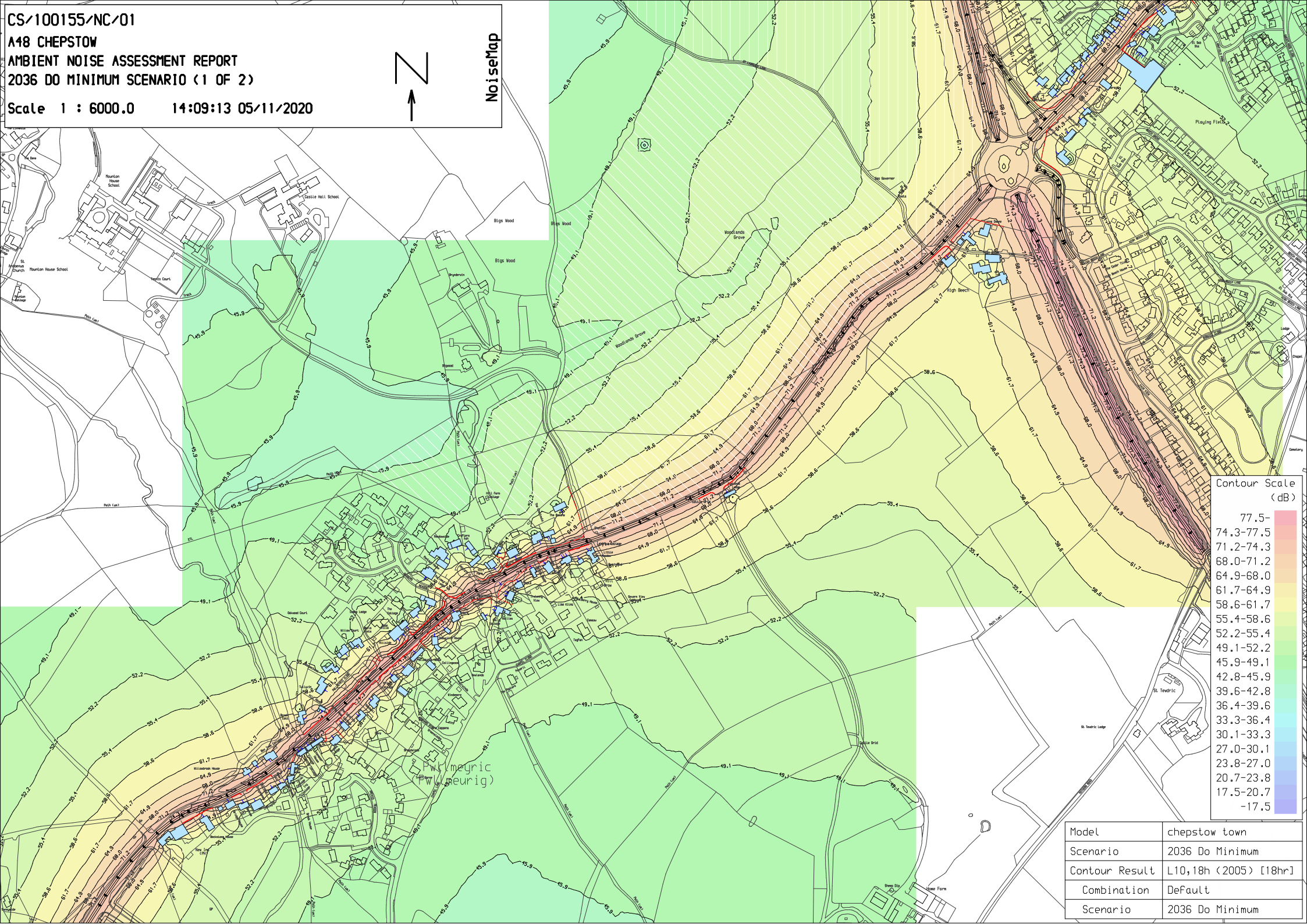
A48 CHEPSTOW

AMBIENT NOISE ASSESSMENT REPORT

2036 DO MINIMUM SCENARIO (1 OF 2)

Scale 1 : 6000.0 14:09:13 05/11/2020

NoiseMap



Model	chepstow town
Scenario	2036 Do Minimum
Contour Result	L10,18h (2005) [18hr]
Combination	Default
Scenario	2036 Do Minimum

CS/100155/NC/02

A48 CHEPSTOW

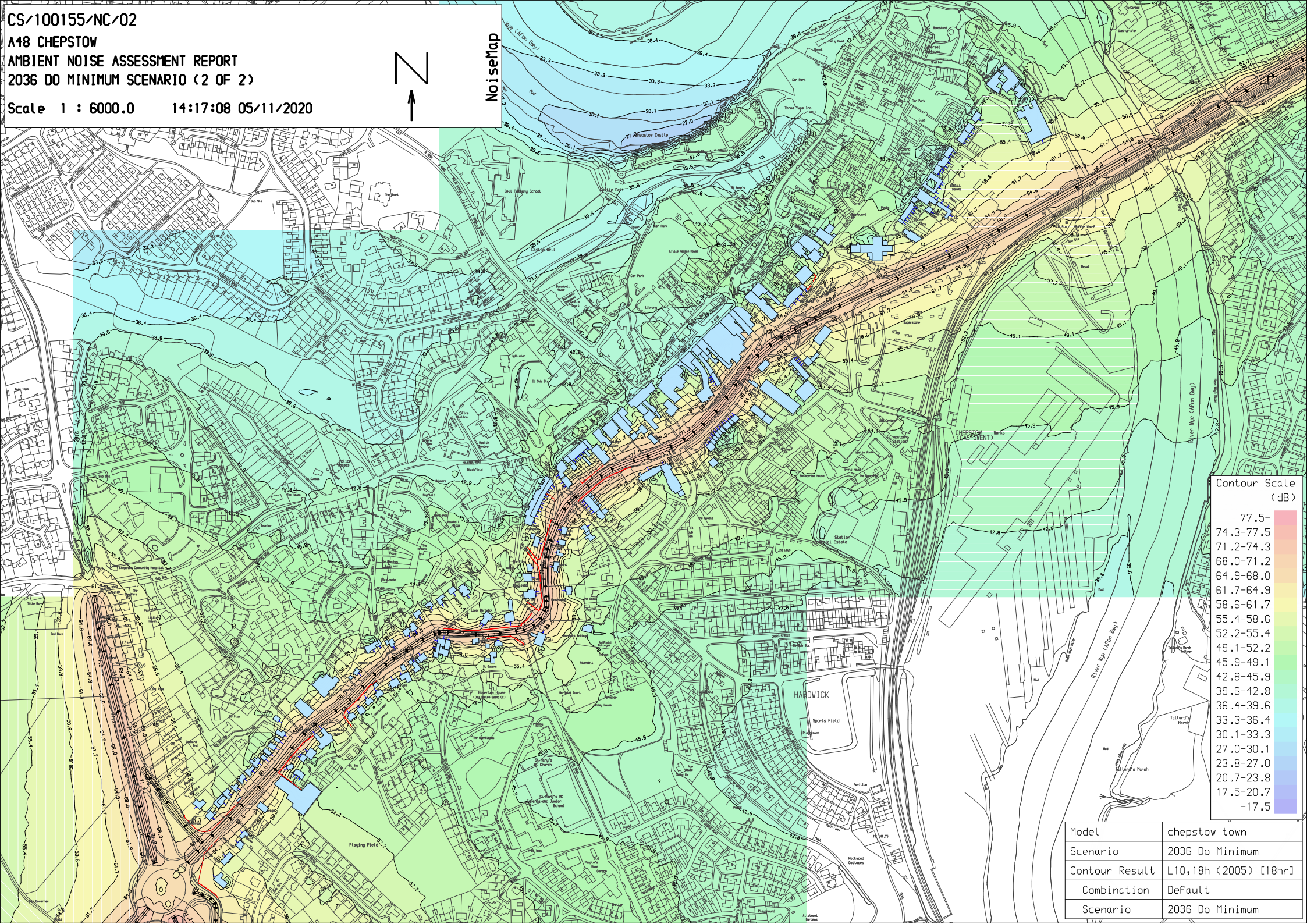
AMBIENT NOISE ASSESSMENT REPORT

2036 DO MINIMUM SCENARIO (2 OF 2)

Scale 1 : 6000.0 14:17:08 05/11/2020

N

NoiseMap



Model	chepstow town
Scenario	2036 Do Minimum
Contour Result	L10,18h (2005) [18hr]
Combination	Default
Scenario	2036 Do Minimum

CS/100155/NC/03

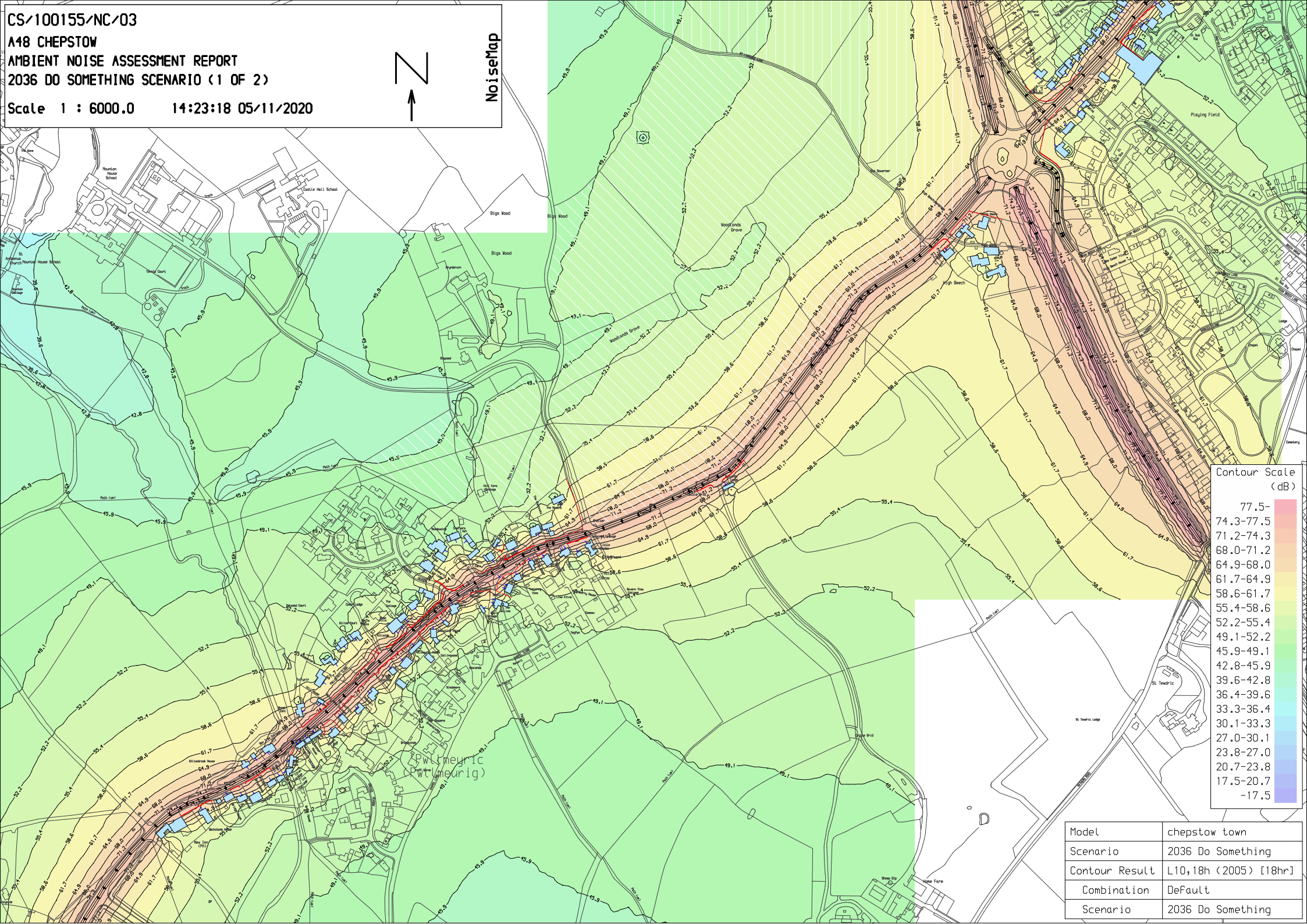
A48 CHEPSTOW

AMBIENT NOISE ASSESSMENT REPORT

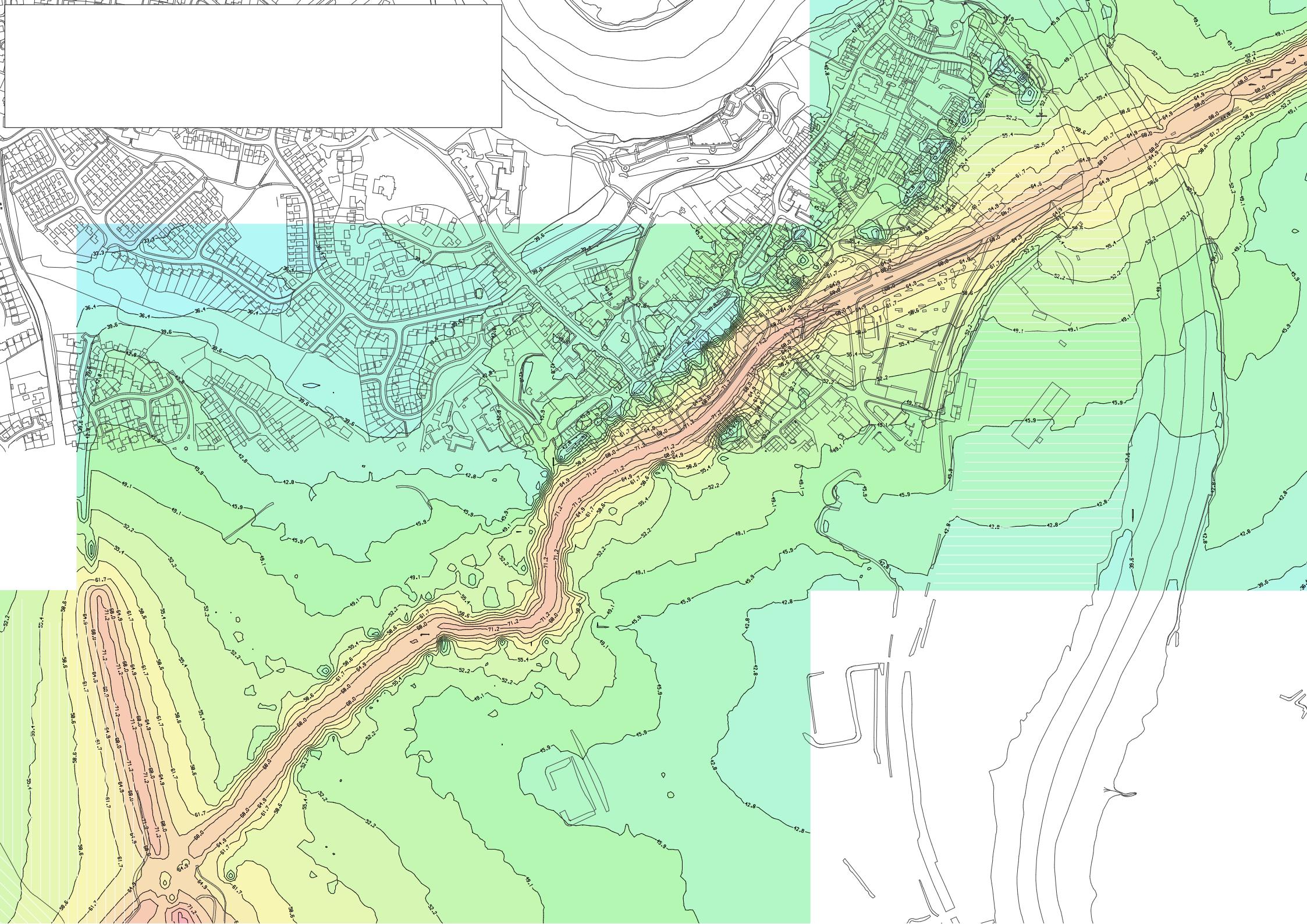
2036 DO SOMETHING SCENARIO (1 OF 2)

Scale 1 : 6000.0 14:23:18 05/11/2020

NoiseMap



Model	chepstow town
Scenario	2036 Do Something
Contour Result	L10,18h (2005) [18hr]
Combination	Default
Scenario	2036 Do Something



Drawings

Key:

Proposed development location

Rev	Drwn	Chk'd	App'd	Description	Date
P02	YW	DJ	DJ	Site location revised	18/08/2021

Purpose of Issue
S2 - Suitable for information

Classification
Confidence : Public/Low sensitivity

Client
CYNGOR monmouthshire COUNTY COUNCIL sir fynwy

Project
A48(T) Chepstow
Bradbury Farm TA
Ambient Noise Assessment Report

Drawing
Site Location Plan

Scale @ A3	Drawn	Checked	Approved
1:25,000	YKW	GBW	GBW

Project No.	Date
CS/100155	19/10/2020

Drawing Identifier — BS1192 Compliant
Project - Originator - Zone - Level - File Type - Role - Number — rev
BFNR-CAP-00-XX-DR-V-0001 — P02

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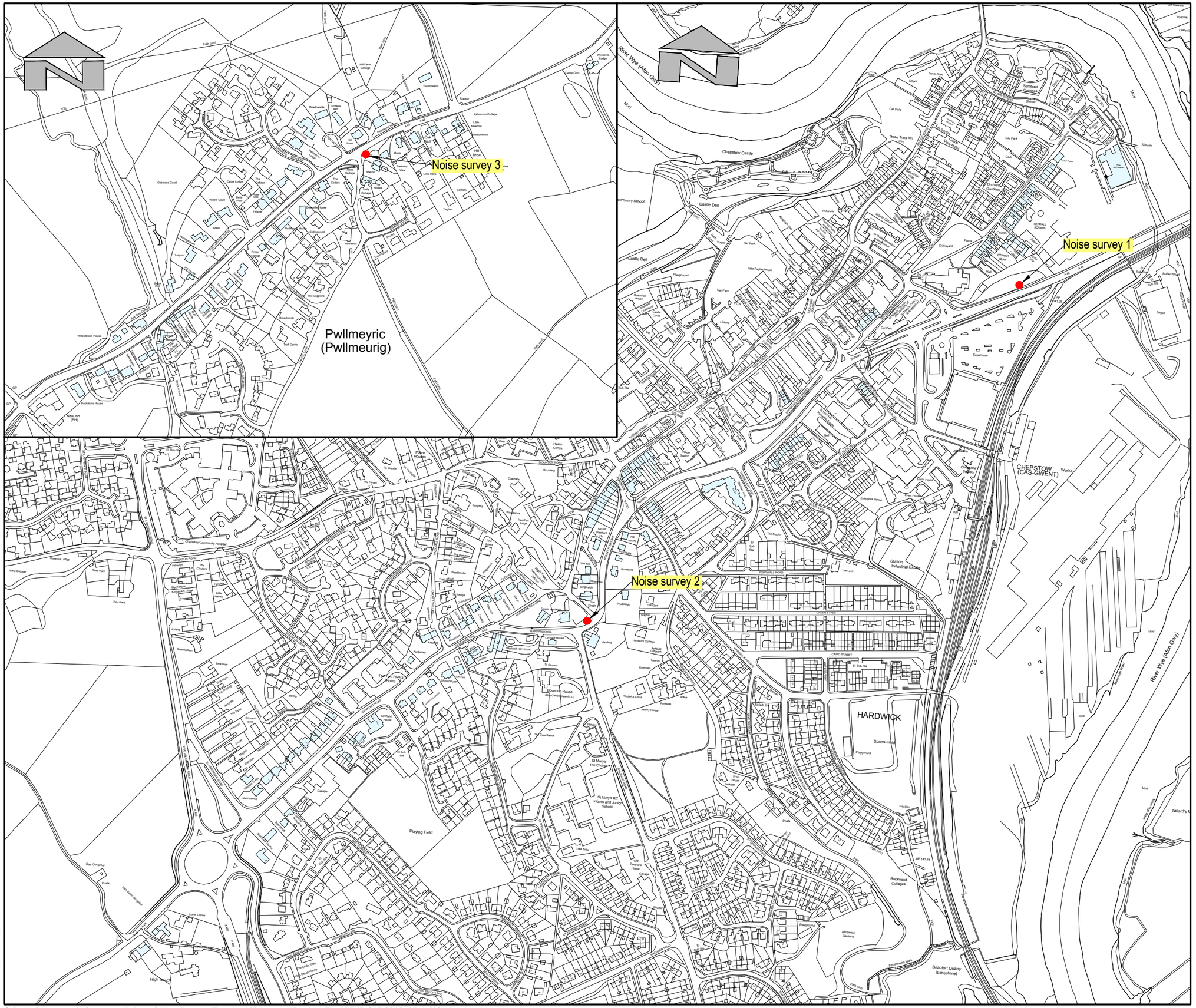

Key

Properties Assessed

3 hour Noise survey location

Notes:

Survey information:

* Microphone positioned at 1.2m high
* Wind speed of less than or equal to 10 m/s
* Survey period - 3 x 3 hour duration

Rev	Drwn	Chk'd	App'd	Description	Date

Purpose of Issue

S2 - Suitable for information

Classification

Confidence : Public/Low sensitivity

Client

CYNGOR monmouthshire COUNTY COUNCIL sir fynwy

Project

A48(T) Chepstow
Bradbury Farm TA
Ambient Noise Assessment Report

Drawing

Noise Measurement Locations
and Properties Assessed

Scale @ A3	Drawn	Checked	Approved
1:5000	YKW	GBW	GBW

Project No.	Date
CS/100155	04/11/2020

Drawing Identifier — BS1192 Compliant

Project - Originator - Zone - Level - File Type - Role - Number — rev

BFNR-CAP-00-XX-DR-V-0002 — P01

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Print Date:04/11/2020 16:08:24

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