

Project:	New Hydroelectric Generation Scheme Caversham	Date:	30/07/2020
Client:	Reading Hydro CBS Ltd	Ref:	4588



Project:	New Hydroelectric Generation Scheme Caversham		
Client:	Reading Hydro CBS Ltd		
Report Title:	Environmental Noise Survey		
Author:	J Gillott MIOA	Date:	30/07/2020
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Paragon Acoustic Consultants Ltd
Unit 12b Southview Business Park, Caversham,
Reading RG4 5AF
Tel: 0118 944 8444



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1.0 Introduction

It is proposed to Construct a new hydroelectric generation scheme and associated natural fish pass at Caversham Weir (on spit of land between View Island and Caversham Weir) in Reading on the River Thames.

Paragon Acoustic Consultants Ltd has been commissioned to conduct an environmental noise survey to obtain statistical noise data to characterise the existing local background and ambient noise climate at the site and to derive noise limits to atmosphere based on Local Authority Noise requirements and other relevant guideline documents where considered appropriate. This information shall be used at the appropriate stage of the project to determine if the proposed new hydroelectric generation scheme will meet with the derived noise limits and if noise mitigation measures will be required.

2.0 Site Description and Proposed Plant Location

2.1 Site Description

The location of the new hydroelectric generation scheme proposed on the north side of the existing weir adjacent to Caversham Lock.

The nearest residential premises that will potentially be most impacted by the noise of the proposed new hydroelectric generation scheme are as follows:

Lock keepers house on the island adjacent to the lock: This property is approximately 60m from the location of the proposed hydroelectric plant. It is noted however that although this is potentially the closest residential property to the proposed new scheme the noise of the weir is high at this property, thus this is not necessarily the worst affected property.

Residential flats in Kingfisher Place, overlooking the Thames Path: These residential flats are located to the south west of the weir at an estimated 140m from the location of the proposed hydroelectric plant.

Residential flats in Luscinia View located to the east of the proposed scheme. These residential flats are up to 10 storeys in height and are located approximately 400m distance from the proposed hydroelectric plant.

Residential properties to the north / north east on roads such as Heron Island, Mill Green, Queens Road, Coldicut Street, etc. The closest of these properties These properties are approximately 210m from the proposed hydroelectric plant.

The site is illustrated by plan in Appendix A.

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2.2 Proposed Plant Location

An extract of the drawing indicating the proposed plant location and layout is shown below:

Figure 1: Proposed Location of Scheme



3.0 Existing Noise Climate

3.1 Weir Noise

Noise emanating from the Caversham weir dominated the noise climate at the lock-keepers cottage at MP1. The weir noise was just audible at MP2, and not audible to the writer at other locations. It is considered that the river levels were relatively low during the survey. Advice from one of the project team (Mr David Whipple) shows the flow rates for the for the survey dates (daytime before the night survey of 22-23/07/2020) as follows:

	16th July	17th July	22nd July	High flow Q5	Mean flow	Median flow Q50	Low flow Q95	
Flow at Reading Bridge	8.9	8.6	9.6	126	37	22	5	m3/s
Water Level at Reading Bridge	36.7	36.7	36.75	36.8			36.6	m aod
Water level below Caversham weirs	35.28	35.28	35.29	36.1			35.3	m aod

Mr Whipple went on to advise:

“As you can see the flow at the moment is very low. If levels are important to you, you should know that for most of the time the upstream level is held more or less constant, while the downstream level responds much more directly to flow rates. It is lowest at low flows, and rises up at higher flows. Consequently the drop at the weir does the opposite, being highest at low flow, and diminishing during flood events”.

It should be noted that there will potentially be variations of weir noise over the year due to different water levels / volumes of water passing over the weir and how the weir is controlled. As a result, it is reasonable to assume that noise levels will vary due to the water noise over the weir and the measured noise during the survey by this practice may only be applicable for the period in time when surveyed. Without extensive surveying and associated costs, it is not

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possible to comment on the noise levels that may occur at different conditions to that during the survey.

3.2 Road Traffic

Noise emanating from vehicular road traffic was deemed to provide a significant contribution to the ambient noise climate proximal to the nearest affected residential premises. The overall noise comprises both individual “event” type emissions from vehicles passing along local roads, and also continuous low frequency “rumble” due to middle distance traffic flows.

3.3 Rail Traffic

Rail traffic was audible during manned periods of surveys, emanating from the from train movements associated with Reading main line train station and tracks. Train noise events will have been included within certain of the readings taken.

3.4 Aircraft

Aircraft over flights were observed sporadically during the manned periods of surveys. Their contribution to the background noise climate will have been included within the measurements taken.

3.5 Boat Traffic

At the measurement position by Kingfisher Place residential apartments boat traffic was sporadic during the daytime measurements, this being the traffic associated with the boats passing through Caversham Lock.

3.6 Mechanical Noise Sources

Mechanical noise sources were observed at the measurement positions.

3.7 Construction Noise

Construction noise was audible during the manned periods at certain positions. It is unusual for construction noise to occur prior to 08:00 hours and after 18:00 hours or at weekends and public holidays. The Local Authority usually also restrict construction hours where planning is required. As such, it is unlikely likely that construction noise will impact on the readings between 18:00 and 08:00 hours.

3.8 Other Noise Sources

Birdsong was evident in a number of the locations during the daytime measurements, as was noise due to wind moving foliage. Daytime MP4, 14:00-15:00 – nearby group of people and middle-distance garden equipment.

4.0 Environmental Noise Survey

4.1 Measurements

The noise measurement surveys took place on the following dates:

Lock keepers house on the island adjacent to the lock: Noise monitoring undertaken 16/07/2020 at 10:26 to 17/07/2020 at 10:26 generally unmanned.

Residential flats in Kingfisher Place, overlooking the Thames Path, Residential flats in Luscinia View located to the east of the proposed scheme and Residential properties to the north / north

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east: Disaggregated manned readings taken during daytime Critical periods 16/07/2020 (day) and 23/07/2020 (night).

The noise measurements were undertaken at the location as described below.

- **MP1:** Lock keepers house – rear garden
- **MP2:** Residential flats in Kingfisher Place – corner of Kings Meadow Road and Thames Path
- **MP3:** Luscinia View near flats.
- **MP4:** Off Mill Road

The measurement location is illustrated on the site layout drawing in Appendix A.

Various statistical broad-band and spectral sound pressure level measurements were obtained during the survey. A measurement time interval $T_m = 15$ minutes was used for sampling. Measurements of the percentile level $L_{A90,T}$ were made using time weighting F as per clause 3.4 of BS 4142:2014.

The quantities recorded included:

- **L_{Aeq} :** the equivalent continuous A-weighted sound pressure level over the measurement period
- **L_{Amax} :** the maximum A-weighted sound pressure level for the measurement period
- **L_{A10} :** the A-weighted sound pressure level exceeded for 10% of the measurement period
- **L_{A90} :** the A-weighted sound pressure level exceeded for 90% of the measurement period

4.2 Weather during survey periods

The weather conditions during the surveys 16/17 July 2020 were dry and warm with slight cloud cover and little breeze. Weather conditions during the night-time surveys were mild and dry with a slight breeze. It is considered that the data obtained provided sufficient data to give the typical lowest likely background noise level for the proposed hydroelectric plant operational period.

4.3 Instrumentation

Sound pressure level measurements were obtained using the following instrumentation complying with the Type 1 specification of BS EN 60804, BS EN 60651, BS EN 60942, BS EN 61260, and BS EN 61672-1:

- MP1: SVAN 971 Sound level meter serial number 56213, pre-amplifier type SV18 serial number 57308, and type 7052E ½" microphone serial number 65483.
- MP2, 3 and 4: Norsonic Type 118 Sound level analyser, serial number 31322

Calibration checks were made prior to and after completion of measurements using a Norsonic Type 1251 acoustical calibrator complying with Class 1 of BS EN 60942, calibration level 114.0 dB $\pm$ 0.3 dB, @ 1.0 kHz. All instrumentation carries a current manufacturer's certificate of conformance a copy of which is available upon request.

MP1: The sound level analyser was mounted on a boom approx. 3m above ground to extend above the rear garden wall of the lock keepers property.

MP2, 3 and 4: The sound level analyser was mounted on a tripod set to provide a measurement height of 1.5 metres above ground level.

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4.4 Results

The recorded survey data is shown within Appendix B.

For MP1 the broadband sound pressure level data over the survey period (L_{A90} background levels, L_{Aeq} and L_{Amax} measurements) are shown graphically below:

Figure 2: Graphical Survey Data

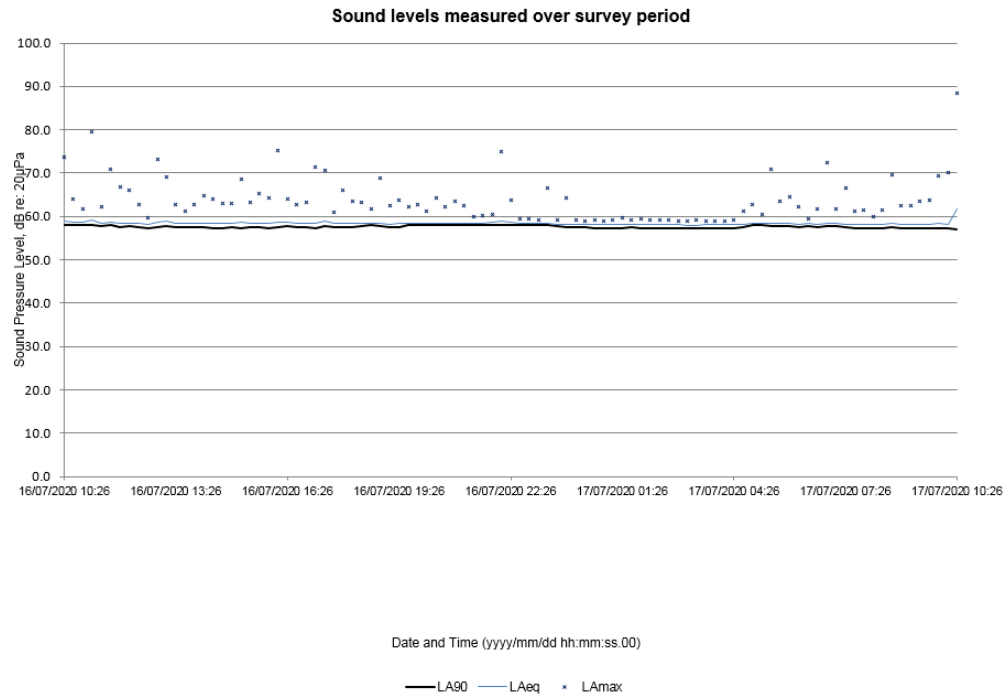


Table 1: Typical lowest background sound levels

Measurement Position	Daytime 07:00-23:00 $L_{A90,(15\text{ min})}$	Night-time 23:00-07:00 $L_{A90,(15\text{ min})}$
MP1 measurement position (lock keepers Cottage)	57 dB	57 dB
MP2 measurement position (Residential flats in Kingfisher Place)	47 dB	40 dB
MP3 measurement position (Luscinia View near flats)	45 dB	36 dB
MP4 measurement position (Off Mill Road)	41 dB	30 dB

5.0 Evaluation of External Noise Criteria

The local vicinity contains properties of mixed usage, which must be given due consideration in terms of acceptable levels of noise exposure from the new plant.

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5.1 Noise Sensitive Properties

5.1.1 Reading Borough Local Plan

The Reading Borough Local Plan (Adopted November 2019) includes a Section related to Noise Generating Equipment. EN 17 advises:

EN17: NOISE GENERATING EQUIPMENT

Where noise generating equipment is proposed, the noise source specific⁶¹ level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor.

⁶¹ The noise source specific level is the measured noise level, as opposed to the rating level, which is the specific level with correction factors included.

The Local Plan goes on to say:

4.2.92 The Local Plan proposals will see a high level of development within Reading. Reading is a densely populated town with many new planning developments taking place. Residents live in close proximity to commercial activities, therefore it is important to minimise background creep in order to protect the noise environment and maintain quality of life for people living and working in the town. The negative impact of environmental noise on health is becoming better understood (for example WHO 1999, 2009 and 2011/62).

4.2.93 Planning Practice Guidance on noise states that no specific measures are required to manage the acoustic environment in situations where noise can be heard as a result of a development and there is a slight effect on the acoustic character of the area but there is no effect on the behaviour and attitude of people exposed to the noise. However, the guidance also states that:

- The cumulative impacts of more than one source of noise should be considered; and*
- In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring.*

4.2.94 The Council considers that the above two factors apply due to the town being densely populated and there being a high likelihood of subsequent noise generating plant being installed in a particular location. It is therefore necessary for each planning application for noisy plant to protect the acoustic environment and as far as possible prevent the increase in background noise levels because the cumulative impact of installation of noisy plant which causes an increase in background noise level is likely to lead to an adverse effect.

4.2.95 The Planning Practice Guidance on noise also states that local planning authorities may decide to develop specific standards to apply to various forms of proposed development in their area. It cautions against the implementation of fixed thresholds because specific circumstances may justify some variation being allowed. Because this policy sets a noise target in relation to the background noise level, this allows variation of the threshold with the local circumstances because it does not set an absolute noise level that the plant must achieve, it relates it to the local noise level.

4.2.96 Where the plant noise rating level does not meet this standard, the background noise will increase. When subsequent new plant is added it will be assessed against this higher background level which results in an increasing benchmark against which subsequent new plant is introduced. This leads to an incremental increase in the noise in an area each time new plant is introduced ('background creep'). This policy standard has been applied by Reading Borough Council for a number of years and experience has demonstrated it to be

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achievable in most cases. In addition, noise control technology is improving, therefore further increasing the achievability of this standard.

61 The noise source specific level is the measured noise level, as opposed to the rating level, which is the specific level with correction factors included.

62 World Health Organisation (WHO) (1999), Guidelines for Community Noise; WHO (2009), Night Noise Guidelines for Europe; WHO (2011), Burden of Disease from Environmental Noise: Quantification of healthy life years lost in Europe

This practice has attempted to obtain advice from RBC Public Protection Service to establish if there are any individual requirements for this installation. At the time of writing the report this practice has not been issued with a reply providing answers to the question raised in the e-mail issued by this practice to themselves.

Based on the details of the Reading Borough Local Plan Adopted November 2019 the specific plant noise levels shall be least 10 dB below the background noise level. The assessment shall consider this limit, and also the content of BS4142:2014, as described in the following Section.

5.1.2 BS 4142:2014

BS 4142:2014: “*Methods for rating and assessing industrial and commercial sound*” describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes sound from fixed installations which comprise mechanical and electrical plant and equipment.

The methods described in the standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The standard provides a method for correcting the specific sound levels so as to account for acoustic features that are present at the assessment location (scaled corrections up to +6 dB for tones and up to +9 dB for impulses, depending upon the prominence of the tones or impulses, as well as +3 dB corrections for other sound characteristics).

Where characteristics likely to affect perception and response are present in the specific sound within the same reference period; then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant, to the exclusion of the others, then it may be appropriate to apply a reduced, or even zero, correction to the minor characteristics.

Whereas the 1997 edition of BS4142 assess likelihood of complaints, the 2014 edition was revised to use assessment of adverse impacts. This change was introduced because the likelihood of complaints is not a particularly appropriate benchmark, especially when it is used in a planning context, and it also aligns the standard more closely with the type of language and benchmarks that are suitable for the assessment of sound at the planning stage, e.g., for new proposed development.

The 2014 edition of the standard continues to use the difference between the rating level and the background sound level:

- a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a

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significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

The Local Authority Local Plan requires that the noise source specific level should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor. It is noted that the plan refers to the "Specific level" and confirms that this is as opposed to the "Rating Level"

The specific sound level, $L_s = L_{Aeq,Tr}$ is the equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr .

Whilst the Local Authority requirements consider the specific sound level of the plant it is considered reasonable to also limit the rating level of the plant that does not exceed background noise levels. The Rating level, $L_{Ar,Tr}$ is the specific sound level plus any adjustment for the characteristic features of the sound.

5.1.3 World Health Organisation: 1999: "Guidelines for Community Noise"

This document provides a review of the effects of noise and a description of the principles of the WHO health criteria and guidelines for Community Noise.

The effects of noise in dwellings are identified as sleep disturbance, annoyance and speech interference. For bedrooms, the critical effect is sleep disturbance. The indoor guideline value for continuous noise in bedrooms is 30 dB LAeq. For noise events, the guideline value has been set at 45 dB L_{Amax}, and it is further advised that this value should not be exceeded by more than 10-15 times per night to ensure "good sleep".

To enable casual conversation indoors during the daytime, the sound level of the interfering noise should not exceed 35 dB LAeq.

Table 1 of the document summarises the guideline values for community noise in specific environments and includes the noise indices to be adopted. Significantly, the corresponding time base to be used for the assessment is also included.

The relevant extracts of Table 1 are reproduced thus:

Specific environment	Critical health effect(s)	L_{Aeq} [dB]	Time base [hours]	L_{Amax} fast [dB]
Dwelling, indoors	Speech intelligibility & moderate annoyance daytime & evening	35	16	
	Sleep disturbance, night-time	30	8	45

5.1.4 External amenity space

The World Health Organization, document "Guidelines for Community Noise" advises the following:

To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB LAeq. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.

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5.2 Commercial Properties

It is considered appropriate to assess noise emissions to commercial properties in line with the guidelines provided in BS 8233:2014.

Figure 3: BS8233:2014 table of typical noise levels in non-domestic buildings

Activity	Location	Design range dB $L_{Aeq,T}$
Speech or telephone communications	Department store	50 – 55
	Cafeteria, canteen, kitchen	
	Concourse	45 – 55
	Corridor, circulation space	
Study and work requiring concentration	Library, gallery, museum	40 – 50
	Staff/meeting room, training room	35 – 45
	Executive office	35 – 40
Listening	Place of worship, counselling, meditation, relaxation	30 – 35

Figure 4: BS8233:2014 table of indoor ambient noise levels

Objective	Typical situations	Design range $L_{Aeq,T}$ dB
Typical noise levels for acoustic privacy in shared spaces	Restaurant	40 – 55
	Open plan office	45 – 50
	Night club, public house	40 – 45
	Ballroom, banqueting hall	35 – 40
	Living room	35 – 40

NOTE See Noise control in building services [28] and BS EN ISO 3382.

In view of the details presented above it is considered reasonable to adopt a noise criterion of 40 dB $L_{Aeq,T}$ for the internal spaces of a library.

It is also reasonable to consider a noise criterion external to commercial property windows that takes account of the internal design range, plus the loss expected through an openable window. In a research study conducted for DEFRA NANR116: “Open/Closed Window Research”, numerous references are provided which quantify losses through open and partially open windows:

Figure 5: DEFRA NANR16 Summary of findings

Information Source	Summary of Findings
PPG 24 (1994) ^[8]	A reduction of 13 dB(A) from the facade level is assumed for an open window
WHO (1999) ^[6]	A reduction of 15 dB from the facade level is assumed for a partially open window. (no reference)
BS 8233 (1999) ^[9]	Windows providing rapid ventilation and summer cooling are assumed to provide 10 - 15 dB attenuation (no specific reference)
BRE Digest 338 (1988) ^[8]	A partly open window has an averaged level difference, $D_{f,w,100-3150}$ of 15 dB
DoE Design Bulletin 26 (1972) ^[7]	A reduction of 5 dB(A) with a window wide open
Nelson - Transportation Noise (1987) ^[8]	Sound insulation of an open single window is 5 – 15 dB. (theoretical)
Mackenzie & Williamson DoE Report (1972-73) ^{[6],[9]}	A vertical sliding sash window open 0.027 m ² (summer night-time ventilation) and 0.36 m ² (daytime summer ventilation) provided a sound level reduction of 16 and 11 dB(A) respectively. (Lab Study)
Kerry and Ford (1973 – 74) ^{[10],[12]}	A horizontal sliding sash window open 25 mm and 200 mm provided averaged sound reduction indices, R_w of 14 and 9 dB respectively. (Field Study)
Lawrence and Burgess (1982 – 83) ^{[13],[14]}	A vertical sliding sash open 9% of the total facade provided a sound reduction index R_w 10 dB. (Field study)
Hopkins (2004) ^[15]	Road traffic noise reductions through window openings resulted in reductions of between $D_{f,w,1-2}$ 8 and 14 dB. (Field Study)

Table 1.1 Summary of open-window acoustic transmission literature

The findings of the study are referenced in this report to substantiate the use of a 13 dB(A) loss through a partially open window. This leads to a limiting noise criteria of 53 dB $L_{Aeq,T}$ at a position 1 metre external to the windows of commercial properties.

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5.3 External Noise Criteria

The derived external noise criteria which the new building services plant shall be required to achieve are shown below:

Table 2: Limiting Noise Criteria applicable at the affected premises

Plant Location	Receptor	Quantity	Daytime 07:00-23:00	Night-time 23:00-07:00
As given in Section 2.2 herein	Noise Sensitive Development ^[3] : Lock Keepers House	specific sound level	47 dB $L_{Aeq,Tr}$ ^{[2] [3]}	47 dB $L_{Aeq,Tr}$ ^{[2] [3]}
		rating level	57 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}	57 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}
	Residential flats in Kingfisher Place	specific sound level	37 dB $L_{Aeq,Tr}$ ^{[2] [3]}	30 dB $L_{Aeq,Tr}$ ^{[2] [3]}
		rating level	47 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}	40 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}
	Residential flats in Luscinia View	specific sound level	35 dB $L_{Aeq,Tr}$ ^{[2] [3]}	26 dB $L_{Aeq,Tr}$ ^{[2] [3]}
		rating level	45 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}	36 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}
	Residential properties to the north / north east on roads such as Heron Island, Mill Green, Queens Road, Coldicut Street, etc	specific sound level	31 dB $L_{Aeq,Tr}$ ^{[2] [3]}	20 dB $L_{Aeq,Tr}$ ^{[2] [3]}
		rating level	41 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}	30 dB $L_{Ar,Tr}$ ^{[1] [2] [3]}
	Commercial	specific sound level	53 dB L_{Aeq} ^[2]	
	Outdoor amenity space ^[4]	specific sound level	50 dB L_{Aeq} ^[4]	

[1] Note: Noise levels to be assessed in accordance with BS4142:2014. L_{ArT} is the "Rating" noise level that includes corrections for the character of the noise.

[2] Note: The limiting noise levels are deemed to be considered at a position 1 metre outside the nearest affected premises.

[3] Note: All residential properties including, hotels, hospitals.

[4]: Outdoor amenity spaces in the vicinity of the weir such as the lock keepers property garden are already subject to noise levels that exceed 50 dB L_{Aeq} due to the existing weir noise. Where weir noise exceeds 50 dB L_{Aeq} at existing locations it is suggested that the outdoor amenity space predicted hydroelectric power noise level can increase to 55 dB L_{Aeq} .

It has been verbally advised that the proposed new hydroelectric generation system shall operate when the water flow provides sufficient energy to operate the hydroelectric generation system. This may occur at any time of the day or night 365 days /year, and as such the night-time noise limits will dictate whether the proposed hydroelectric generation scheme will meet with the noise limits required. It has also been confirmed that if too much water is flowing across the river the turbine may not operate.

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6.0 Conclusions

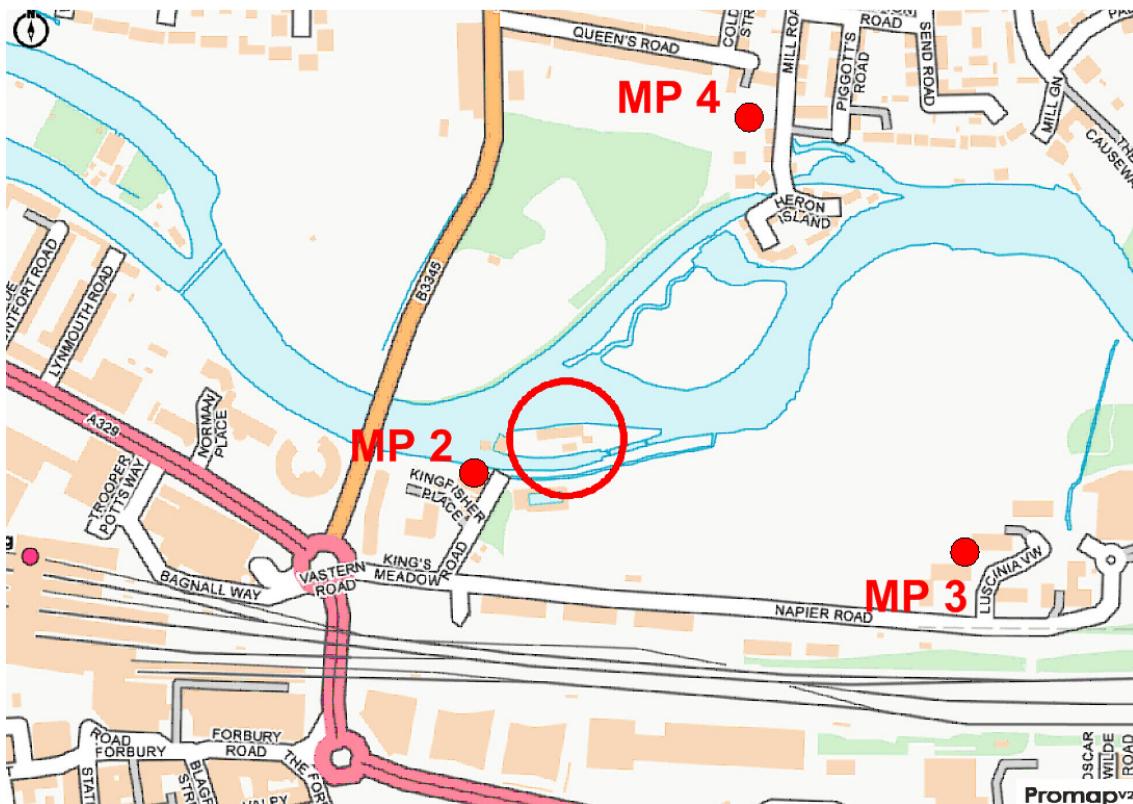
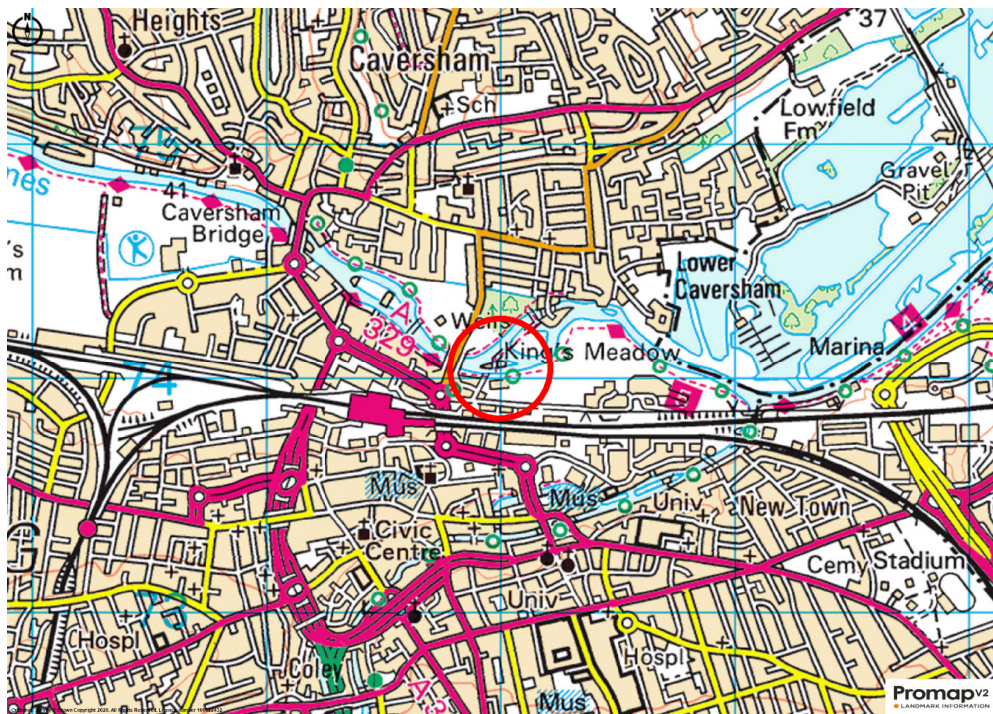
Background noise surveys has been undertaken to determine the noise climate likely to exist at noise sensitive properties in the vicinity of the proposed new hydroelectric generation scheme at Caversham Weir.

External noise criteria have been identified on the basis of Local Authority noise policy, and other industry standards, codes of practice and references. These external noise criteria shall be used in the future assessment of noise emissions of the proposed new hydroelectric generation scheme at Caversham Weir to determine if the noise limits are achieved and any noise mitigation measures considered necessary.

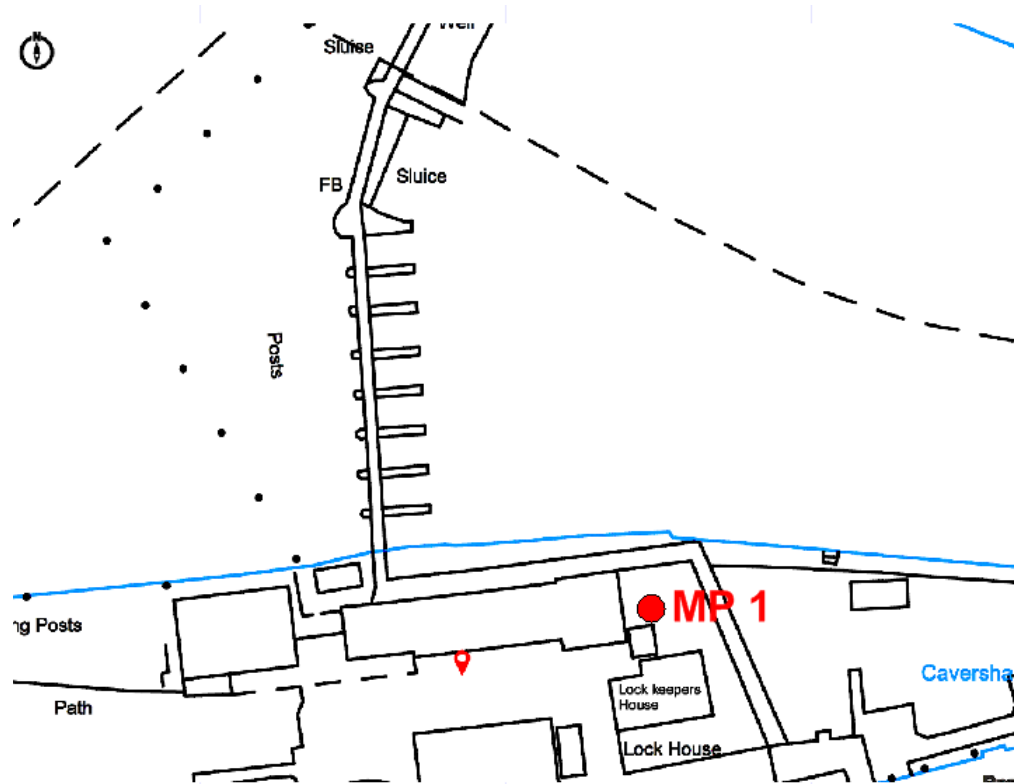
With due consideration to achieving compliance with these external noise criteria, future objections would not be expected in respect of noise emissions from any new fixed mechanical plant which may form part of the planning application.

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Appendix A: Site Plans



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Appendix B: Recorded Survey Data

MP1

1st day	LAT(max)	Latg	LTD	LRD	2nd day	LAT(max)	Latg	LTD	LRD
00:00	0.00	0.00	0.00	0.00	06:56	72.49	58.44	58.90	57.70
00:00	0.00	0.00	0.00	0.00	07:11	61.81	58.35	58.90	57.80
00:00	0.00	0.00	0.00	0.00	07:26	66.46	58.28	58.90	57.50
00:00	0.00	0.00	0.00	0.00	07:41	61.22	58.20	58.80	57.40
00:00	0.00	0.00	0.00	0.00	07:56	61.33	58.23	58.80	57.40
00:00	0.00	0.00	0.00	0.00	08:11	59.96	58.25	58.90	57.40
00:00	0.00	0.00	0.00	0.00	08:26	61.56	58.19	58.80	57.30
00:00	0.00	0.00	0.00	0.00	08:41	69.66	58.52	58.90	57.50
00:00	0.00	0.00	0.00	0.00	08:56	62.51	58.15	58.80	57.30
00:00	0.00	0.00	0.00	0.00	09:11	62.52	58.20	58.90	57.20
00:00	0.00	0.00	0.00	0.00	09:26	63.61	58.17	58.90	57.20
00:00	0.00	0.00	0.00	0.00	09:41	63.73	58.17	58.80	57.30
00:00	0.00	0.00	0.00	0.00	09:56	69.28	58.32	58.90	57.20
00:00	0.00	0.00	0.00	0.00	10:11	70.12	58.25	58.90	57.20
10:26	73.65	58.88	59.50	58.00	10:26	88.45	61.64	60.00	57.00
10:41	64.07	58.69	59.50	58.00	00:00	0.00	0.00	0.00	0.00
10:56	61.62	58.68	59.60	58.00	00:00	0.00	0.00	0.00	0.00
11:11	79.63	59.16	59.40	58.00	00:00	0.00	0.00	0.00	0.00
11:26	62.18	58.52	59.30	57.60	00:00	0.00	0.00	0.00	0.00
11:41	71.01	58.72	59.50	58.00	00:00	0.00	0.00	0.00	0.00
11:56	66.79	58.41	58.90	57.60	00:00	0.00	0.00	0.00	0.00
12:11	66.14	58.54	59.40	57.70	00:00	0.00	0.00	0.00	0.00
12:26	62.75	58.49	59.20	57.60	00:00	0.00	0.00	0.00	0.00
12:41	63.74	58.27	58.90	57.40	00:00	0.00	0.00	0.00	0.00
12:56	73.08	58.75	59.40	57.50	00:00	0.00	0.00	0.00	0.00
13:11	69.20	58.82	59.80	57.90	00:00	0.00	0.00	0.00	0.00
13:26	62.70	58.50	59.40	57.50	00:00	0.00	0.00	0.00	0.00
13:41	61.20	58.38	58.90	57.60	00:00	0.00	0.00	0.00	0.00
13:56	62.63	58.35	58.90	57.50	00:00	0.00	0.00	0.00	0.00
14:11	64.74	58.50	59.20	57.50	00:00	0.00	0.00	0.00	0.00
14:26	64.12	58.33	58.90	57.40	00:00	0.00	0.00	0.00	0.00
14:41	63.04	58.41	59.10	57.40	00:00	0.00	0.00	0.00	0.00
14:56	63.05	58.39	59.00	57.50	00:00	0.00	0.00	0.00	0.00
15:11	68.51	58.61	59.10	57.40	00:00	0.00	0.00	0.00	0.00
15:26	63.35	58.38	58.90	57.50	00:00	0.00	0.00	0.00	0.00
15:41	65.40	58.50	59.30	57.60	00:00	0.00	0.00	0.00	0.00
15:56	64.34	58.37	58.90	57.40	00:00	0.00	0.00	0.00	0.00
16:11	75.10	58.60	59.00	57.60	00:00	0.00	0.00	0.00	0.00
16:26	63.94	58.60	59.50	57.70	00:00	0.00	0.00	0.00	0.00
16:41	62.86	58.33	58.90	57.50	00:00	0.00	0.00	0.00	0.00
16:56	63.18	58.39	58.90	57.60	00:00	0.00	0.00	0.00	0.00
17:11	71.40	58.42	58.90	57.40	00:00	0.00	0.00	0.00	0.00
17:26	70.60	58.65	59.60	57.70	00:00	0.00	0.00	0.00	0.00
17:41	61.04	58.38	58.90	57.60	00:00	0.00	0.00	0.00	0.00
17:56	66.13	58.49	59.20	57.60	00:00	0.00	0.00	0.00	0.00
18:11	63.60	58.37	58.90	57.50	00:00	0.00	0.00	0.00	0.00
18:26	63.21	58.46	59.10	57.70	00:00	0.00	0.00	0.00	0.00
18:41	61.83	58.46	58.90	58.00	00:00	0.00	0.00	0.00	0.00
18:56	68.77	58.36	58.90	57.70	00:00	0.00	0.00	0.00	0.00
19:11	62.44	58.29	58.90	57.50	00:00	0.00	0.00	0.00	0.00
19:26	63.80	58.33	58.90	57.60	00:00	0.00	0.00	0.00	0.00
19:41	62.35	58.51	59.00	58.00	00:00	0.00	0.00	0.00	0.00
19:56	62.63	58.43	58.90	58.00	00:00	0.00	0.00	0.00	0.00
20:11	61.25	58.43	58.90	58.00	00:00	0.00	0.00	0.00	0.00
20:26	64.31	58.42	58.90	58.00	00:00	0.00	0.00	0.00	0.00
20:41	62.23	58.50	58.90	58.00	00:00	0.00	0.00	0.00	0.00
20:56	61.61	58.40	58.90	58.00	00:00	0.00	0.00	0.00	0.00
21:11	62.47	58.48	58.90	58.00	00:00	0.00	0.00	0.00	0.00
21:26	59.88	58.52	58.90	58.00	00:00	0.00	0.00	0.00	0.00
21:41	60.22	58.53	58.90	58.00	00:00	0.00	0.00	0.00	0.00
21:56	60.46	58.64	59.30	58.00	00:00	0.00	0.00	0.00	0.00
22:11	74.92	58.64	59.40	58.00	00:00	0.00	0.00	0.00	0.00
22:26	63.89	58.59	59.10	58.00	00:00	0.00	0.00	0.00	0.00
22:41	59.32	58.47	58.90	58.00	00:00	0.00	0.00	0.00	0.00
22:56	59.45	58.46	58.90	58.00	00:00	0.00	0.00	0.00	0.00
23:11	59.31	58.37	58.90	58.00	00:00	0.00	0.00	0.00	0.00
23:26	66.65	58.36	58.90	58.00	00:00	0.00	0.00	0.00	0.00
23:41	59.21	58.28	58.80	57.70	00:00	0.00	0.00	0.00	0.00
23:56	64.19	58.29	58.90	57.60	00:00	0.00	0.00	0.00	0.00
00:11	59.20	58.20	58.80	57.50	00:00	0.00	0.00	0.00	0.00
00:26	59.02	58.21	58.80	57.50	00:00	0.00	0.00	0.00	0.00
00:41	59.17	58.20	58.80	57.40	00:00	0.00	0.00	0.00	0.00
00:56	59.00	58.17	58.80	57.40	00:00	0.00	0.00	0.00	0.00
01:11	59.13	58.18	58.80	57.40	00:00	0.00	0.00	0.00	0.00
01:26	59.64	58.20	58.80	57.40	00:00	0.00	0.00	0.00	0.00
01:41	59.14	58.22	58.80	57.50	00:00	0.00	0.00	0.00	0.00
01:56	59.36	58.22	58.80	57.40	00:00	0.00	0.00	0.00	0.00
02:11	59.27	58.20	58.80	57.40	00:00	0.00	0.00	0.00	0.00
02:26	59.12	58.13	58.80	57.30	00:00	0.00	0.00	0.00	0.00
02:41	59.10	58.14	58.80	57.30	00:00	0.00	0.00	0.00	0.00
02:56	59.01	58.13	58.80	57.30	00:00	0.00	0.00	0.00	0.00
03:11	58.87	57.99	58.80	57.20	00:00	0.00	0.00	0.00	0.00
03:26	59.20	58.03	58.80	57.20	00:00	0.00	0.00	0.00	0.00
03:41	58.95	58.07	58.80	57.20	00:00	0.00	0.00	0.00	0.00
03:56	59.03	58.07	58.80	57.20	00:00	0.00	0.00	0.00	0.00
04:11	59.02	58.11	58.80	57.30	00:00	0.00	0.00	0.00	0.00
04:26	59.16	58.19	58.80	57.40	00:00	0.00	0.00	0.00	0.00
04:41	61.32	58.29	58.80	57.60	00:00	0.00	0.00	0.00	0.00
04:56	62.75	58.38	58.90	58.00	00:00	0.00	0.00	0.00	0.00
05:11	60.45	58.35	58.90	58.00	00:00	0.00	0.00	0.00	0.00
05:26	70.96	58.36	58.90	57.90	00:00	0.00	0.00	0.00	0.00
05:41	63.61	58.33	58.90	57.80	00:00	0.00	0.00	0.00	0.00
05:56	64.62	58.32	58.90	57.70	00:00	0.00	0.00	0.00	0.00
06:11	62.24	58.30	58.90	57.60	00:00	0.00	0.00	0.00	0.00
06:26	59.55	58.33	58.90	57.50	00:00	0.00	0.00	0.00	0.00
06:41	61.72	58.28	58.90	57.60	00:00	0.00	0.00	0.00	0.00

Project:	New Hydroelectric Generation Scheme Caversham	Date:	30/07/2020
Client:	Reading Hydro CBS Ltd	Ref:	4588

MP2, 3 and 4

Day time noise levels					
Location	Time	LAeq	LAFmax	LA10	LA90
MP 2 Residential flats in Kingfisher Place	11:00-12:00	57.3	83.7	58.4	47.1
MP 2 Residential flats in Kingfisher Place	12:00-13:00	51.7	64.7	54.5	47.5
MP 2 Residential flats in Kingfisher Place	13:00-14:00	49.8	58.8	51.6	47.3
MP3 Luscinia View near flats	11:00-12:00	48.4	60.5	51.1	45.1
MP3 Luscinia View near flats	12:00-13:00	47.2	61.2	47.9	44.5
MP3 Luscinia View near flats	13:00-14:00	47.5	59.6	49.7	44.8
MP4 Off Mill Road	14:00-15:00	45	61.7	45.3	40.9
MP4 Off Mill Road	15:00-16:00	56.6	79.5	57.5	42.9
MP4 Off Mill Road	16:00-17:00	46.8	56.5	48.9	43.3

Night time noise levels					
Location	Time	LAeq	LAFmax	LA10	LA90
MP 2 Residential flats in Kingfisher Place	00:00-01:00	46	60.1	48.5	41
MP 2 Residential flats in Kingfisher Place	01:00-02:00	47.3	64.7	49.7	39.7
MP 2 Residential flats in Kingfisher Place	02:00-03:00	42.6	52.5	45.9	39.6
MP3 Luscinia View near flats	00:00-01:00	50.6	62.5	51.6	39.5
MP3 Luscinia View near flats	01:00-02:00	45.9	59.1	47.1	36.3
MP3 Luscinia View near flats	02:00-03:00	45.3	55.5	44.2	39.4
MP4 Off Mill Road	00:00-01:00	36	58.2	36.8	29.8
MP4 Off Mill Road	01:00-02:00	35.5	62.3	34.4	29.7
MP4 Off Mill Road	02:00-03:00	33.3	46	33.8	29.5