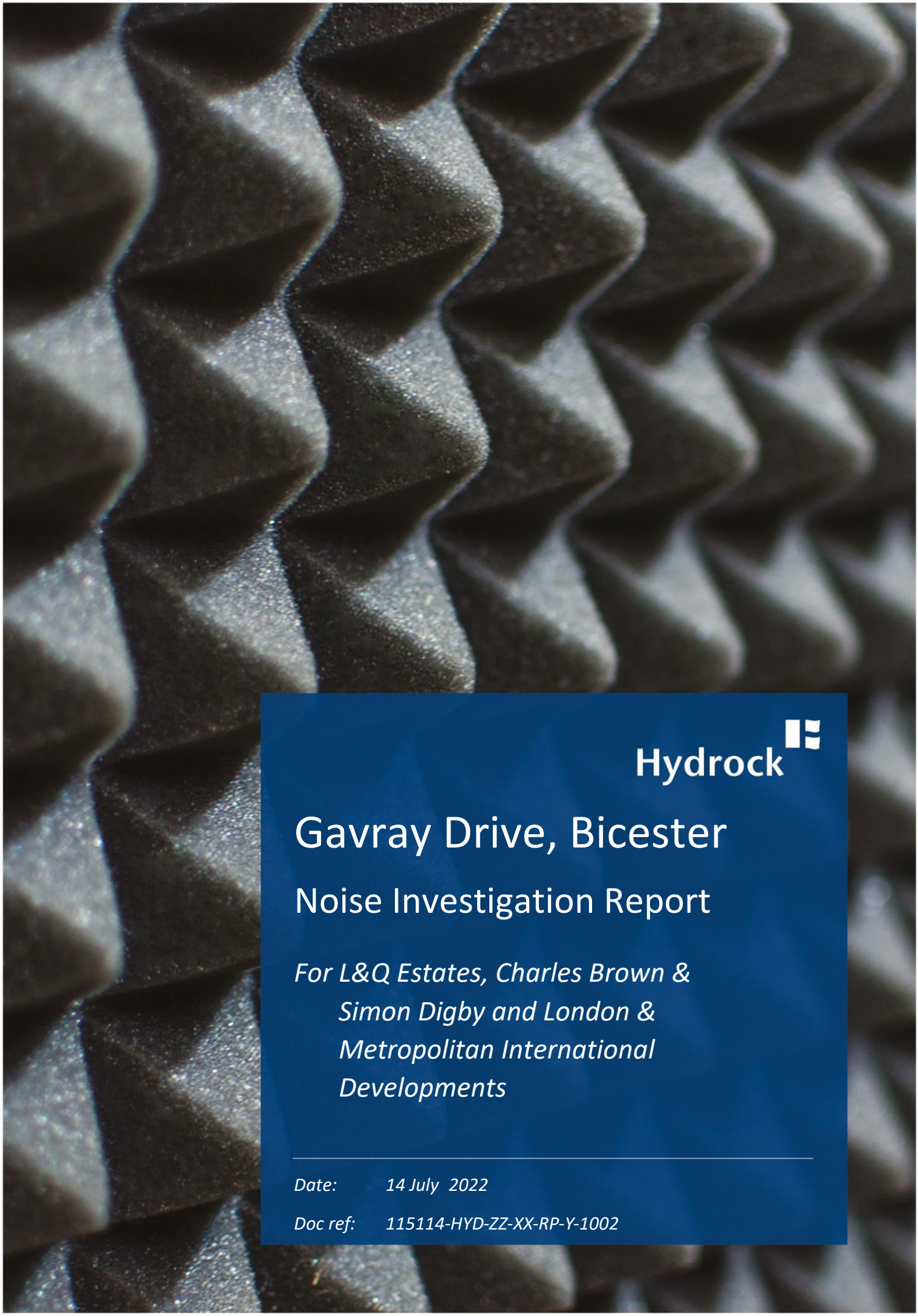

Hydrock

Gavray Drive, Bicester

Noise Investigation Report

For L&Q Estates, Charles Brown & Simon Digby and London & Metropolitan International Developments

Date: *14 July 2022*

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Appendices

Noise Investigation Report

Gavray Drive, Bicester

1. INTRODUCTION

Hydrock Consultants are appointed by L&Q Estates, Charles Brown & Simon Digby ,and London & Metropolitan International Developments to provide acoustic consultancy services in relation to the proposed residential development at Gavray Drive, Bicester.

An Environmental Statement and Noise Assessment Report (115114-HYD-ZZ-XX-RP-Y-1001, 8th July 2021) were provided with a planning application for 250 new dwellings (21/03558/OUT). Subsequently Hydrock were informed by the local authority that they have received several noise complaints related to an unidentified source of commercial noise in the area. A concern was raised that the proposed new dwellings may be affected by this existing source of commercial noise.

The issue was discussed with Trevor Dixon of Cherwell District Council in April 2022. Mr Dixon indicated that the complaints were from the Langford Area to the south west of Gavray Drive and in particular the area around Heron Drive . The noise was described as a constant tonal drone which was more noticeable at night and in north or north westerly winds. Mr Dixon indicated that he had carried out some investigation and thought the source of noise may have been the Walstead Commercial Printers close to Javis Lane. However, it is understood the that Mr Dixon's investigations were not conclusive. My Dixon noted that there were dwellings closer to Walstead than those in Langford from which no complaints had been received. There are a number of other commercial operations to the north west of Langford and the proposed development site.

This report documents further investigations carried out by Hydrock into the source of the noise complaints. Hydrock have not spoken to any of the complainants nor have complainants been identified to Hydrock. Hydrock have carried out additional surveys of the site and surroundings, including in north and north westerly winds, with the specific intent of identifying continuous night-time commercial noise matching the description provided by Mr Dixon. Measurements were made close to Walstead, existing Langford dwellings and on the proposed development site as well as close to other sources of commercial noise in the area.

This report is technical in nature; therefore, a glossary of acoustic terminology is provided in Appendix A.

2. NOISE SURVEY

2.1 Methodology

A noise survey was carried out over the period 26th to 30th May, 2022. Two sound level meters were installed to log audio and sound levels for the duration of the survey. The instruments were unattended for the majority of the survey. The intention was to attend site during the night of Thursday 26th-27th May for a subjective assessment. However, this was aborted due to a change in the forecast wind direction from north west to south west during Thursday evening. Winds were from approximately the north from Friday evening to Monday morning and therefore ideal for capturing the reported commercial sound during this period of the survey. An additional attended noise survey was carried on evening of the 29th of June to make a subjective assessment and near-field measurements of plant at the Walstead Commercial Printer and identify other potential sources of commercial noise.

Noise measurements were made using Class 1 sound level meters. Microphones were at least 1.2m above the ground and at least 3.5m from any other reflecting surfaces. The sound level meters were calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey in both occasions. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

All measurement equipment has been laboratory calibrated within the appropriate calibration interval.

Both surveys took place during periods of light winds (5ms^{-1}) and no significant precipitation.

Details of the equipment used are provided in Table 1 and Table 2.

Table 1: Unattended Noise Survey Instrumentation Details

Monitoring Location	Manufacturer	Instrument	Type	Serial No./Version	Laboratory Calibration due
ML1	01dB	Sound Level Meter	Fusion	14159	13/10/2023
		Microphone	40CD	367053	
ML2	01dB	Sound Level Meter	Fusion	12242	14/07/2023
		Microphone	40CD	347053	
ML1, ML2	Rion	Acoustic Calibrator	NC74	35157400	12/07/2023

Table 2: Attended Unattended Noise Survey Instrumentation Details

Manufacturer	Instrument	Type	Serial No./Version	Laboratory Calibration due
01dB	Sound Level Meter	Fusion	14159	13/10/2023
	Microphone	40CD	367053	
Rion	Acoustic Calibrator	NC74	35157400	12/07/2023
DTAPE	Laser Measuring Meter	DT50	2022103015749	N/A

The locations of unattended noise monitors installed over the period 28th to 30th May, 2022 are presented in Figure 1. Figure 2 identifies the noise sources measured during the attended noise survey.

Figure 1: Noise monitoring position for the unattended noise measurements.

Figure 2: Identified noise sources, measured in the attended noise survey.

3. SUMMARY OF INVESTIGATION AND RESULTS

Upon consideration of the noise sources surrounding the site and with reference to the information shared by Trevor Dixon, the first noise survey was planned with the intent of identifying and recording commercial noise that could trigger complaints at the proposed development site and close to existing dwellings. The monitoring locations were provided to Mr Dixon on the 19th May 2022. No comments were received.

Upon investigation of the data collected and review of the audio, it was possible to identify a distinct noise with strong tonal components (around 100Hz) which was present at both monitoring locations identified in Figure 1. This is a common characteristic of electrical transformers operating on an alternating current frequency of 50Hz.

An attended noise survey was then carried on the evening of the 29th of June 2022 to identify the source of the noise.

Measurements were made close to Walstead Commercial Printers, which had been identified by Mr Dixon as operating noisy plant through the night. Hydrock investigated other industrial units working 24 hours that could potentially contribute to the evening and night time noise levels. The British Bakels manufacturing site was identified. Therefore, measurements of plant associated with this unit were also measured.

One other source, identified during an evening walk around the proposed development site and existing receptors on the 29th of June 2022 was also measured. This appeared to be an electrical generator installed at the end of Gavray Drive, associated with the Chiltern Railway.

3.1 Summary of Measured Noise Levels.

Multiple short term attended measurements were made of plant at Walstead and British Bakels. Measurements were also made of the Chiltern Railway Generator. Distances were measured with a laser measuring device. Results are presented in Table 3. Presented results are the higher levels of multiple measurements of each identified source. Measured noise levels have been normalised to a distance of 1m to enable comparison.

Subjective descriptions of the noise sources are also provided based on the character correction description from BS4142:2014. It should be noted that the descriptions relate to what was heard at the near-field measurement locations and not at receptors. Nevertheless, they are useful for determining if the measured sound source has the same characteristics as the sound reported by complainants.

Table 3: Noise levels and Characteristics for each Plant Item Measured, with relation to distance.

Locations	Noise Source	Description / Subjective Assessment	Measurement distance from source in meters	Measured Noise Level, L_{Aeq}, dB	Noise level normalised to 1m, L_{Aeq}, dB
Walstead	Plant A	For the plant identified, the noise produced was continuous broadband, with no notable distinctive characteristics.	11.6	66	87
	Plant B		13.3	70	92
	Plant C		13.3	68	90
	Plant D		6.5	67	83
	Plant E		16.5	71	95
	Total				99
British Bakels	Plant F	The identified plant produced a continuous noise with a slight tone (just audible in the near - field).	27.4	68	97
Chiltern Railway	Plant G	The identified plant produced a continuous low frequency noise with highly distinctive tonal and directivity components. Another characteristic that was distinctive and might be described as a slight impulsivity was also noted.	12.8	50	72

3.1.1 Noise from Chiltern Railway Generator (Plant G)

Measurements and observations show that the noise produced by the Chilterns Railway Generator, identified in Figure 2, has characteristics that make it readily distinguishable against the residual acoustic environment. There is a strong tonal component present. This was not the case for plant measured at Walstead and British Bakels.

Multiple measurements were made which indicate strong directivity with higher noise levels to the south east of the generator. Three measurement locations around the generator were used: to the east, southeast and south, as shown in Figure 3: Plant G measurement locations. Results are presented in Table 4:

Table 4: Measurements around Plant G.

Position	Distance (meters)	Measured noise Levels, $L_{Aeq,10s}$, dB	Predicted levels at 100m, $L_{Aeq,10s}$, dB
East	6.4	49	25
Southeast	12.8	50	32
South	12.5	44	26

Figure 3: Plant G measurement locations

3.2 Prediction of Noise Levels Affecting the Proposed Development Site & Langford Properties

Predicted noise levels on the proposed development site and at existing receptors on Heron Drive in Langford are presented in Table 5. Noise levels on the proposed development site are estimated to the closest proposed residential buildings. Predictions are based on distance attenuation due to geometric divergence only with no consideration of air or ground absorption. Therefore, the estimates are generally higher than would be expected in reality. An estimate of the attenuation due to shielding of intervening buildings and (for the Chiltern Railway Generator) the proposed site railway noise barrier is included. Note, identified plant at Walstead and British Bakels was on the opposite side of the building from both existing dwellings and the proposed development site; therefore, the theoretical maximum shielding correction from ISO 9613-2:1996 of 20 dB is included.

Table 5: Predicted Noise Level

		Heron Drive			Proposed Development Site		
	Total Normalised Level at 1m, LAeq, dB	Distance (m)	Shielding Correction (dB)	Sound Level (L_{Aeq}, dB)	Distance (m) to closest proposed dwellings	Shielding Correction	Sound Level (L_{Aeq}, dB)
Walstead	99	806	20	20	486	20	25
British Bakels	97	648	20	21	246	20	29
Chilterns Railway Generator (south east)	72	527	0	18	NA	NA	NA
Chilterns Railway (east)	65	NA	NA	NA	38	15	18

Predicted noise levels from the generator are similar to noise levels from the other identified commercial noise sources at Heron Drive. However, the sound from the generator is tonal and distinctive which makes it much more likely to cause complaints. Therefore, this is considered to be the most likely cause of the noise complaints from existing dwellings in Langford.

Predicted noise levels affecting the closest proposed dwellings are the same as those affecting Langford. This is in part due to the directivity of the generator, which was noted to emit more sound in a south-easterly direction (in the direction of Heron Drive). Furthermore, the proposed railway noise barrier, which is part of the scheme of noise mitigation measures incorporated in the proposed development to control noise from the railway, will also control noise from the generator.

4. IMPLICATIONS FOR THE PROPOSED DEVELOPMENT

The highest commercial plant noise levels affecting the proposed development are from the British Bakels manufacturing facility. Sound levels from this facility are predicted to be 29 dB L_{Aeq} at the proposed development site. A slight tone was noted when making nearfield measurements of British Bakels plant. However, this was not perceptible on the proposed development site.

The lowest typical measured background sound levels from the original noise survey, reported in the Environmental Statement and report submitted with the planning application, was 32 dB L_{A90}. Therefore, although British Bakels' plant contributes to the night-time background sound level on site, it is not above the combined background sound level from other sources and would not be distinctive or identifiable at the proposed development. Therefore, in line with the guidance contained in BS4142:2014 "Method for rating industrial and commercial sound", noise from Bakels would be a low impact at the proposed development site, depending on the context.

Sound levels from the Chiltern Railway generator are predicted to be 18 dB at the proposed development site. This is the same level as at existing dwellings on Heron Drive due to the directivity of this sound source. Even accounting for any applicable character corrections, this sound source is likely to be below the background sound level on site and therefore a low impact, depending on the context.

With regards to context, it is relevant to consider receptor sensitivity and the history of noise complaints. As noted in the previous section, sound levels from the Chiltern Railway Generator are expected to be the same level at the existing dwellings close to Heron Drive, from where complaints are known to have arisen. However, the affected proposed dwellings will have high levels of environmental noise mitigation built in to control noise from the railway and therefore will be less sensitive. This mitigation will also be effective against noise from Bakels and the generator. Therefore, in consideration of the context the impact of noise from the generator and Barkels plant is expected to be a low impact at the proposed development.

The already proposed façade sound insulation measures include small windows at the railway façades, high performance acoustic laminated double glazing, minimum standards for external wall sound insulation and mechanical ventilation with heat recovery. These measures have been designed to control night-time noise from the railway of 52 dB L_{Aeq} & > 76 dB L_{Amax} to acceptable levels. Therefore, the predicted noise levels of 18 dB L_{Aeq} from the generator is not likely to be significant.

In consideration of the noise mitigation measures already proposed, the noise impact from the generator, accounting for the prominent tone, is likely to be less at the proposed dwellings than at existing dwellings in Langford.

5. SUMMARY AND CONCLUSIONS

Hydrock Consultants have been appointed by L & Q Estates to provide acoustic consultancy services in relation to the proposed residential development located adjacent to Gavray Drive, Bicester.

Following the Noise Assessment and Environmental Statement that was submitted with the planning application, Chiltern District Council Environmental Health department noted that noise complaints were regularly received from existing dwellings in the vicinity of Heron Drive, Langford and raised concerns that the proposed dwellings may be more affected by the as yet unidentified noise source.

Hydrock have carried out an investigation including two additional noise surveys to identify the likely cause of the complaints and assess the implications for the proposed development. Plant associated with Walstead and British Bakels have been measured but are not thought to be the source of the noise complaints. An electrical generator associated with the Chiltern Railway is considered the most likely cause of the complaints due to its distinctive and tonal characteristics.

Noise levels from this noise source at the closest proposed dwellings are expected to be equal in magnitude to noise levels at existing dwellings that are currently raising complaints. However, the proposed development would incorporate a high level of noise mitigation to control noise from the railway. The site has been planned with large barrier blocks closest to the railway to shield dwellings further back. Accommodation within these barrier blocks will be protected from external noise by high performance acoustic laminated double glazing and will use mechanical ventilation with heat recovery to avoid the need for passive ventilation openings. There is also a noise barrier proposed along the railway boundary, to control railway noise, which will also control noise from the generator affecting the site. Therefore, the proposed dwellings will be much less sensitive to noise from the generator than existing dwellings in Langford.

Noise from the generator is not significant compared to noise from the railway line for which mitigation has already been incorporated.

Glossary of technical terms

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

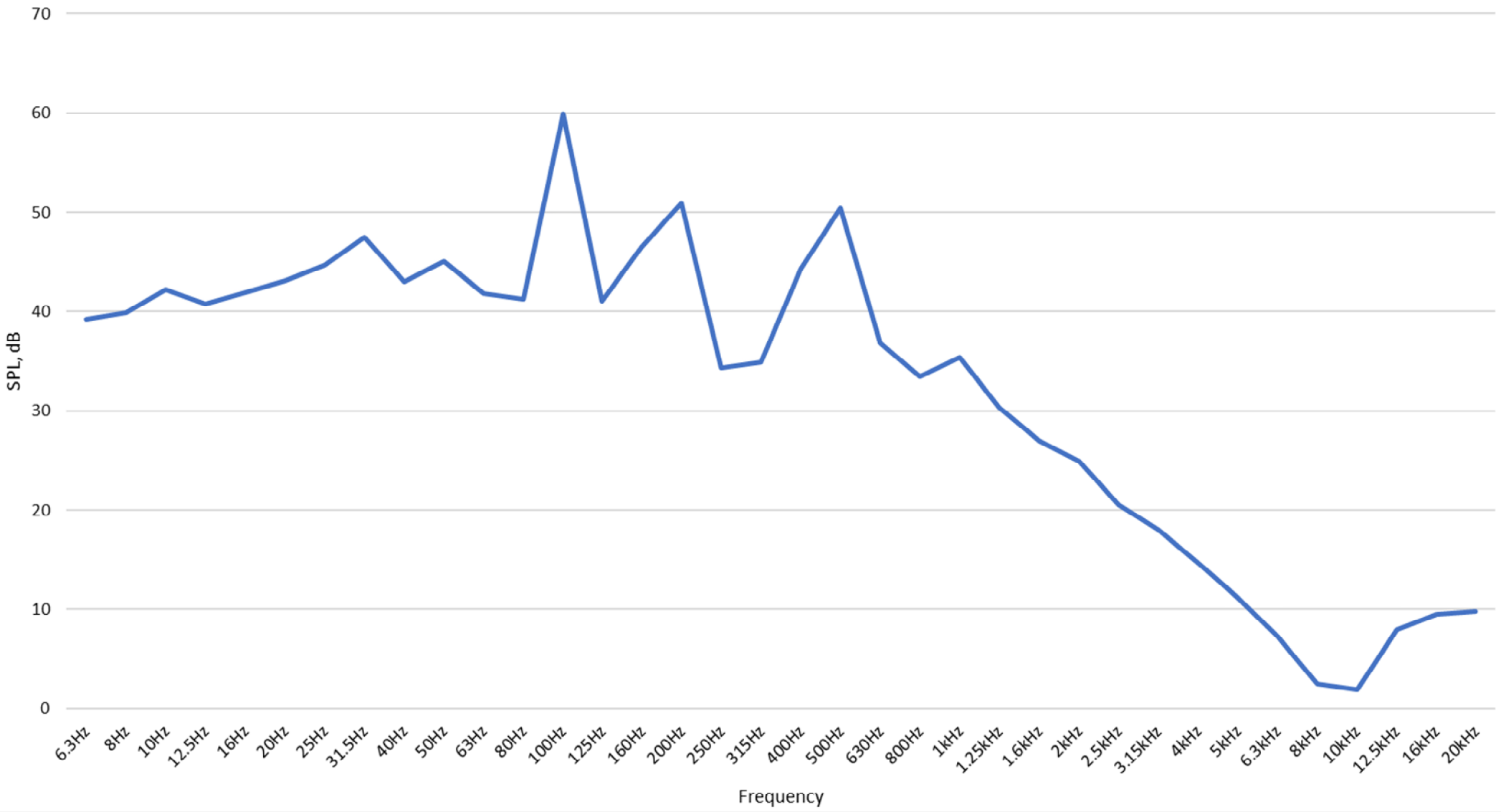
LAeq,T	LAeq is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
LAmax	LAmax is the maximum A - weighted sound pressure level recorded over the period stated. LAmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L10 and L90	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time, and the L90 is the level exceeded for 90% of the time.
Rw	Rw is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
Dn,e,w	Dn,e,w is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
Ctr	Ctr is a correction term applied to single-number sound insulation values (Rw, Dn,e,w etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3m from buildings.

Appendix A Results

Plant G

Noise Spectra

Hydrock



Appendix B Photos of Chiltern Railway Generator


Hydrock