



LAND BOUNDED BY
CHIPPENHAM ROAD,
KINGS LYNN DRIVE,
DARTFIELDS EAST
AND DARTFIELDS
WEST, HAROLD HILL,
ROMFORD, RM3 8HX

External Building Fabric Assessment

Reference: 12965.RP01.EBF.2

Prepared: 15 August 2024

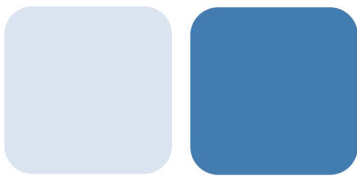
Revision Number: 2

Wates

Wates House

Station Approach

External Building Fabric Assessment



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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	7 March 2024	Robert Gurney	Toby Walton
1	Minor amendments	5 July 2024	Robert Gurney	Toby Walton
2	Development name amended	15 August 2024	Robert Gurney	Toby Walton

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 12965.ACB01.0 dated 16 August 2023. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.



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1.0 INTRODUCTION

This report is in relation to the full planning application submitted to the London Borough of Havering by Havering and Wates Regeneration LLP for the construction of 138 residential units at Land Bounded by Chippenham Road, Kings Lynn Drive, Dartfields East and Dartfields West, Harold Hill, Romford, RM3 8HX. The description of the application can be described as follows:

“Redevelopment of the site and erection of four residential blocks to provide affordable housing units, landscaping works, car parking, cycle parking, plant and associated works.”

An assessment has been carried out in relation to the noise levels likely to be incident on the proposed building façades and to provide acoustic performance specifications such that acceptable internal noise criteria can be achieved.

This report details the results of the noise survey and sets out target acoustic performance requirements of the external building fabric elements. In addition, suitable plant noise emission criteria have been developed based upon the survey results and the likely requirements of the London Borough of Havering.

A summary of acoustic terminology is included in Appendix A.

2.0 SITE DESCRIPTION

The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix E).

The development site is located to the south of Chippenham Road, which runs perpendicular to Farnham Road. The site is encompassed by Kings Lynn Road to the south and Dartfields to either side.

The general noise climate at the site comprises of road traffic noise from Chippenham Road and general suburban sounds.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

Monitoring of the prevailing background noise was undertaken over the following 24-hour period:

11:30 hours Thursday 1 February to 11:30 hours Friday 2 February 2024.

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

Measurements were made of the L_{A90} , L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes.

3.2 Measurement Location

To determine the existing noise climate around the site measurements were undertaken at the following location:

Measurement Position 1 – Harold Hill Church

A microphone was mounted on an A-frame and placed out a window of The Parish of Harold Hill church, overlooking Chippenham Road which is the main noise source affecting the site. As such, the measurement position is considered to be representative of worst-case noise levels incident on the proposed residential development. This position was subject to façade reflection effects.

The measurement position is also illustrated on the site plan attached in Figure 1 (Appendix E).

3.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix C.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

3.4 Results

The noise levels measured are shown as time-histories on the attached Graphs 1-3 (Appendix E).

The typical L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 1, along with typical L_{AFmax} levels measured during the night-time.

Table 1 – Measured Levels

Measurement Period	Typical Background Noise Level, $L_{A90,15min}$ (dB)	Time-Averaged Noise Level, L_{Aeq} (dB)	Typical Maximum Noise Level, $L_{AFmax,5min}$ (dB)
Daytime (07:00 – 23:00)	46	59*	N/A
Night-time (23:00 – 07:00)	36	50*	64*

**These levels have been corrected for façade reflections.*

4.0 PLANNING CRITERIA

This section outlines the assessment criteria relevant to the assessment. A brief explanation of the acoustic terminology used in this report is shown within Appendix A.

4.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF), December 2023, sets out the Government's planning policies for England. In respect of noise, Paragraph 191 of the NPPF states the following:

Planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

The above presents no quantitative guidance on a site's suitability for residential development.

4.2 ProPG

ProPG: Planning & Noise provides guidance on a recommended approach to the management of noise within the planning system in England and was published by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health in May 2017.

It encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise. In light of the recent publication of ProPG, it was considered appropriate to make use of this document for this report, containing the results of our noise survey and provides advice for the pre-planning stage of development conditions.

ProPG provides the following Noise Risk Assessment scale:

Table 2 – ProPG Noise Risk Assessment

Noise Risk	Indicative $L_{Aeq, period}$ Noise Levels (dB)		Comments
	Daytime $L_{Aeq, 16 hr}$ [07:00 – 23:00]	Night-time $L_{Aeq, 8 hr}$ [23:00 – 07:00]	
Negligible	<50 dB	<40 dB	These noise levels indicate that the development site is likely to be acceptable, and the application need not normally be delayed on noise grounds.
Low	50 dB < L < 60 dB	40 dB < L < 50 dB	At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

Noise Risk	Indicative $L_{Aeq, period}$ Noise Levels (dB)		Comments
	Daytime $L_{Aeq, 16 \text{ hr}}$ (07:00 – 23:00)	Night-time $L_{Aeq, 8 \text{ hr}}$ (23:00 – 07:00)	
Medium	60 dB < L < 70 dB	50 dB < L < 60 dB	As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
High	>70 dB	>60 dB	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.

4.3 London Plan

The Greater London Authority (2021) *The London Plan* policies D13 Agent of Change and D14 Noise provide outline guidance for the assessment and approach to noise within London Boroughs. The Plan does not provide criteria to be achieved but does reference the guidance provided in BS 8233:2014, BS 4142:2014+A1 2019 and ProPG.

Important to note is that the London Plan is increasingly being adopted by Local Authorities as a benchmark for good acoustic design.

4.4 Havering Local Plan 2016-2031

The London Borough of Havering's Local Plan 2016-2031 includes three policies relevant to noise, as given below.

Policy 6 – Specialist Accommodation

“The provision of appropriate housing to meet the specialist need of local people will be supported where it can robustly demonstrate that:

[...]

- viii. The proposal does not have any unacceptable adverse impacts on the surrounding area and will not be likely to give rise to significantly unacceptable greater levels of noise and disturbance to occupiers of nearby residential properties...”*

Policy 7 – Residential Design and Amenity

“To protect the amenity of existing and future residents the Council will support developments that do not result in:

[...]

- iii. Unacceptable levels of noise, vibration and disturbance.”*

Policy 34 – Managing Pollution

“The council will support development proposals that:

- i. Do not unduly impact upon amenity, human health and safety and the natural environment by noise, dust, odour and light pollution, vibration and land contamination...”*

5.0 EXTERNAL BUILDING FABRIC CRITERIA

This section outlines the assessment criteria we anticipate the Local Authority will require in terms of the relevant standards.

5.1 British Standard 8233:2014

British Standards Institution (2014) *BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings* draws on the results of research and experience to provide information on achieving internal acoustic environments appropriate to their functions.

The noise level values given are in terms of an average (L_{Aeq}) level.

The standard advises internal ambient noise levels for achieving suitable resting and sleeping conditions within residential properties as set out in Table 3.

Table 3 – BS 8233:2014 Residential Criteria

Room	07:00 to 23:00	23:00 to 07:00
Living Rooms	35 dB $L_{Aeq,16hour}$	--
Dining Room/area	40 dB $L_{Aeq,16hour}$	--
Bedrooms	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

5.2 World Health Organisation Guidelines

WHO (2018) *Environmental Noise Guidelines for the European Region* sets out to define “*recommended exposure levels for environmental noise in order to protect population health*”. The guidance document relates specifically to external noise levels, and recommends that “*all CNG [WHO (1999) *Guidelines for Community Noise*] indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid*”. RBA therefore make reference to Guidelines for Community Noise for recommendations on internal noise levels.

Guidelines for Community Noise describes guideline levels that are “*essentially values for the onset of health effects from noise exposure*”. A table of guideline values is included, relating to adverse health effects, defined as any temporary or long-term deterioration in physical, psychological, or social functioning that is associated with noise exposure. The following is an extract from Table 4.1: Guideline values for community noise in specific environments, as stated in the WHO document.

Table 4 – Guideline Values for Community Noise

Specific Environment	Critical Health Effect(s)	L_{Aeq} (dB)	Time Base (hours)	$L_{Amax,f}$ (dB)
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-times	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

With reference to maximum noise levels the following guidance is provided within the WHO guidance:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991) and most studies show an increase in the percentage of awakenings at SEL values of 55-60 dBA (Passchier-Vermeer 1993; Finegold et al. 1994; Pearsons et al. 1995). For intermittent events that approximate aircraft noise, with an effective duration of 10-30s, SEL values of 55-60 corresponds to a L_{Amax} value of 45 dB. Ten to 15 of these events during an 8 hour night-time implies a $L_{Aeq, 8h}$ of 20-25 dB. This is 10-15 dB below the $L_{Aeq, 8h}$ or 30 dB for continuous night-time noise exposure, and shows that intermittent character of noise must be taken into account when setting night-time noise limits for noise exposure. For example, this can be achieved by considering the number of noise events and the difference between the maximum sound pressure level and the background of these events.”

Therefore the frequency of occurrence of maximum noise events should not typically exceed 10-15 times in any night.

5.3 Summary

The project criteria adopted are therefore as follows:

Bedrooms	Night-time (23:00-07:00)	30 dB L_{Aeq} 45 dB $L_{Amax,f}$ (not normally exceeded)
Living Rooms	Daytime (07:00-23:00)	35 dB L_{Aeq}

6.0 PROPG ASSESSMENT

With reference to Section 2, noise levels at the measurement positions fall within the following Noise Risk Categories as defined in ProPG for both daytime and night-time periods.

Table 5 – Noise Risk Categories

Measurement Position	Noise Exposure Category	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Measurement Position 1	Low	Low

Table 5 above indicates that the (worst-case) measured $L_{Aeq,T}$ noise levels at all positions are classified as low/negligible.

7.0 EXTERNAL BUILDING FABRIC ASSESSMENT

7.1 Background

Analyses of the external building fabric have been undertaken in order to ascertain the required acoustic performance of the glazing and other external fabric elements to achieve the project criteria.

7.2 Preliminary Assessment

Our initial assessment of achievable internal noise levels has been based upon the following information:

- Environmental noise survey data reported herein
- External wall construction is brickwork or lightweight cladding (see below)
- Glazing makes up 40% of the external façade
- Living rooms will typically contain hard floor surfaces, curtains and soft furnishings and bedrooms will be carpeted

External Wall Areas

We have assumed the following sound reduction indices, equating to an overall R_w of 52 dB for all non-glazed façade areas:

Table 6 – Sound Reduction Indices of Non-Glazed Façade Elements

Assumed Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
36	41	45	45	54	58	58	58

Drawings

The assessment has been based on the information provided in the Hawkins\Brown Architects proposed elevations and general arrangement drawings.

Trickle Vents

A standard 'through-the-frame' trickle ventilator with an indirect air path ($D_{n,e,w}$ 33 dB) would be suitable for bedrooms and living rooms.

Glazing

Acceptable internal noise levels for residential use in both bedroom and living rooms should be achieved with double glazed units of differing pane thicknesses such as a 4 mm glass / 12 mm airspace / 6 mm glass configuration achieving a laboratory acoustic rating of R_w 33 dB.

8.0 PLANT NOISE EMISSION

8.1 Criteria

The requirements of the London Borough of Havering's Environmental Health Department regarding new building services plant are understood to be as follows.

"Noise levels expressed as the equivalent continuous sound levels L_{Aeq} (1 hour) when calculated at the boundary with the nearest noise sensitive premises shall not exceed $L_{A90} - 10$ dB and shall be maintained thereafter to the satisfaction of the Local Planning Authority."

In line with the above requirements RBA propose that items of mechanical services be designed so that noise emissions from the plant do not exceed the following levels when assessed at the nearest noise-sensitive location:

- Daytime 36 dB
- Night-time 26 dB

In line with BS 4142:2014, should the proposed plant be identified as having intermittent or tonal characteristics, a further penalty should be subtracted from any of the above proposed noise emission limits.

It should be noted that the above requirements are applied at the nearest residential adjacencies and alternative criteria should be incorporated if there are also commercial properties affected by the proposed plant installations

8.2 Assessment

At this early stage in the design, detailed plant selections have not been made. It is therefore not possible to undertake an assessment to determine compliance with the recommended noise limits.

Once such information is available, an assessment can be carried out to determine what, if any, attenuation measures are required to control noise emission to a suitable level. The above limits should be considered in the development of the building services design.

9.0 CONCLUSION

RBA Acoustics have undertaken noise monitoring at the proposed development site at Land Bounded by Chippenham Road, Kings Lynn Drive, Dartfields East and Dartfields West, Harold Hill, Romford, RM3 8HX. The measured noise levels are presented within this report. The resultant noise levels have been used in the assessment of the glazing requirements to ensure suitable internal noise levels are achieved at the proposed development with reference to BS 8233:2014, WHO Guidelines and Local Authority requirements. Example glazing and trickle vent configurations have been given.

Plant noise emission limits have also been set in line with the requirements of the Local Authority, although at this stage there is insufficient information available to undertake a detailed plant noise emission assessment. This can be undertaken when plant selections are available.

Appendix A – Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
$D_{n,e,w}$	A single number weighted quantity which characterises the airborne sound insulation through a specified small element. A higher numerical quantity represents a better performance.
$L_{eq,T}$	The level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, T , would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10} , L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
$L_{Amax,T}$	The instantaneous maximum A-weighted sound pressure level which occurred during the measurement period, T . It is commonly used to measure the effect of very short duration bursts of noise, e.g. sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the ambient level.
Octave band	A frequency band in which the upper limit of the band is twice the frequency of the lower limit.
1/3 Octave band	A frequency band which is one-third of an octave band.
R_w	A single number quantity which characterises the airborne sound insulation of a material or building element in a laboratory test.

Appendix B – Room Absorption Coefficients

For the purposes of the analyses RBA have assumed the absorption coefficients detailed in Table B1 for bedrooms and Table B2 for living rooms.

Table B1 – Bedroom Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.25	0.27	0.31	0.32	0.32	0.32

Table B2 – Living Room Absorption Coefficients

Absorption Coefficient (α) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
0.15	0.18	0.20	0.22	0.22	0.22	0.23	0.27

Appendix C – Instrumentation

The following equipment was used for the measurements.

Table C1 – Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1407961	477987612	8 May 2025
Norsonic Pre Amplifier	1209	23789		
Norsonic ½" Microphone	1225	496124		
Norsonic Sound Calibrator	1255	125526425	Cal 022-2023-17161	5 May 2025

Appendix D – CDM Considerations

The likelihood the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Remote (almost never)
- 2 – Unlikely (occurs rarely)
- 3 – Possible (could occur, but uncommon)
- 4 – Likely (recurrent but not frequent)
- 5 – Very likely (occurs frequently)

The severity of harm can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
- 2 – Minor (e.g. small cut, abrasion, basic first aid need)
- 3 – Moderate (e.g. strain, sprain, incapacitation for more than 3 days)
- 4 – Serious (e.g. fracture, hospitalisation for more than 24 hours, incapacitation for more than 4 weeks)
- 5 – Fatal (single or multiple)

The rating value is obtained by multiplying the two scores and is then used to determine the course of action.

Table D1 – Risk Ratings

Rating Bands (Severity x Likelihood)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

The following hazards pertinent to our design input have been identified and control measures suggested:

Table D2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Mineral wool within drywalls and linings	Skin and respiratory irritation	Contractors	4	3	12	Wear gloves and mask	1	3	3
Plant room noise levels may be above lower exposure action level	Hearing damage.	Contractors/ Operators	3	4	12	Employer should undertake noise at work assessment.	1	4	4
Glazing - weight	Strain of neck, limbs or back. Fall from height.	Contractors	3	5	15	Provide sufficient manpower, lifting gear and structural support	1	5	5

L: Likelihood S: Severity R: Rating

Appendix E – Graphs and Site Plans

Chippenham Road, havering

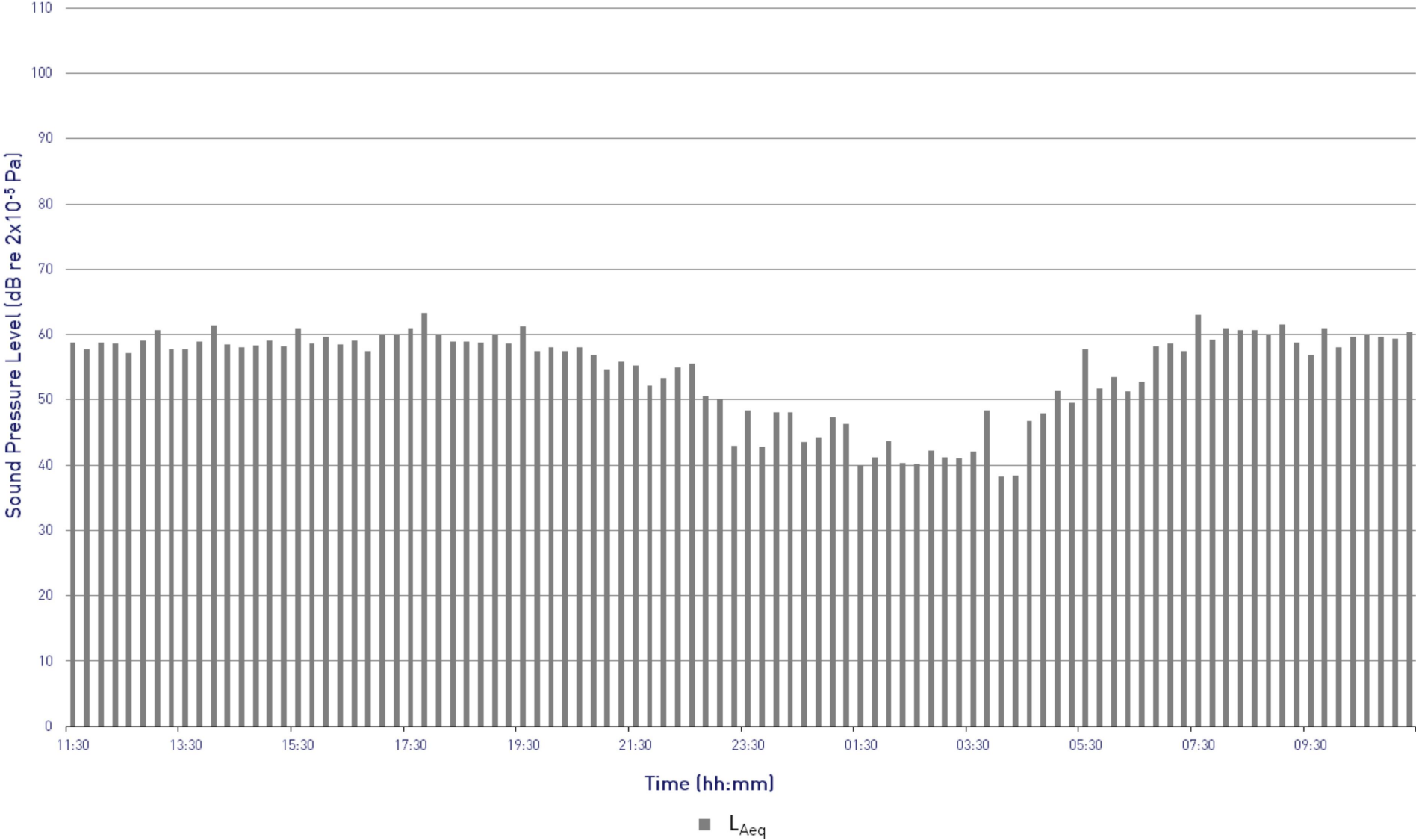
L_{Aeq} Time History

Church



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Graph 1



Chippenham Road, havering

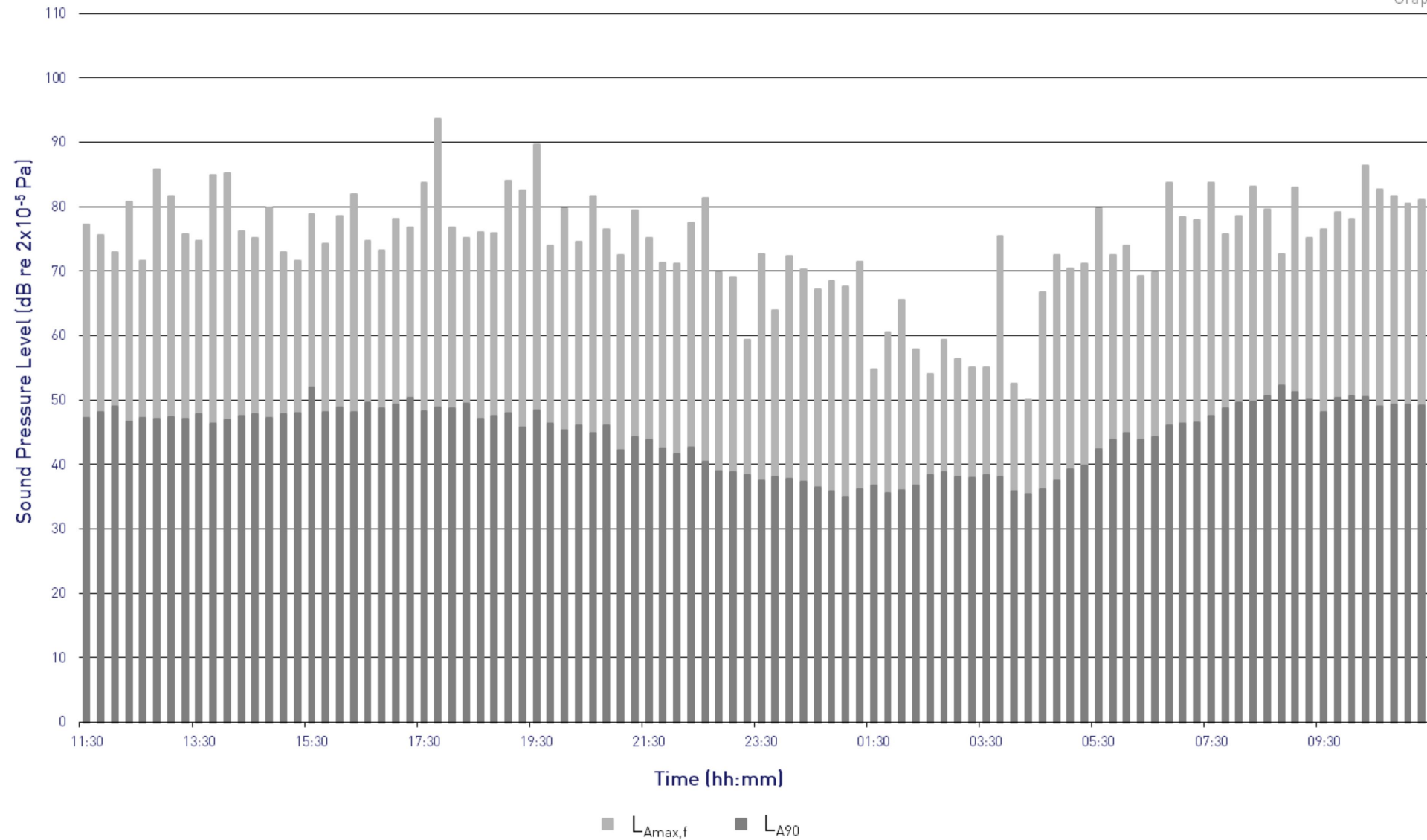
$L_{Amax,f}$ and L_{A90} Time History

Church



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Graph 2



Chippenham Road, havering

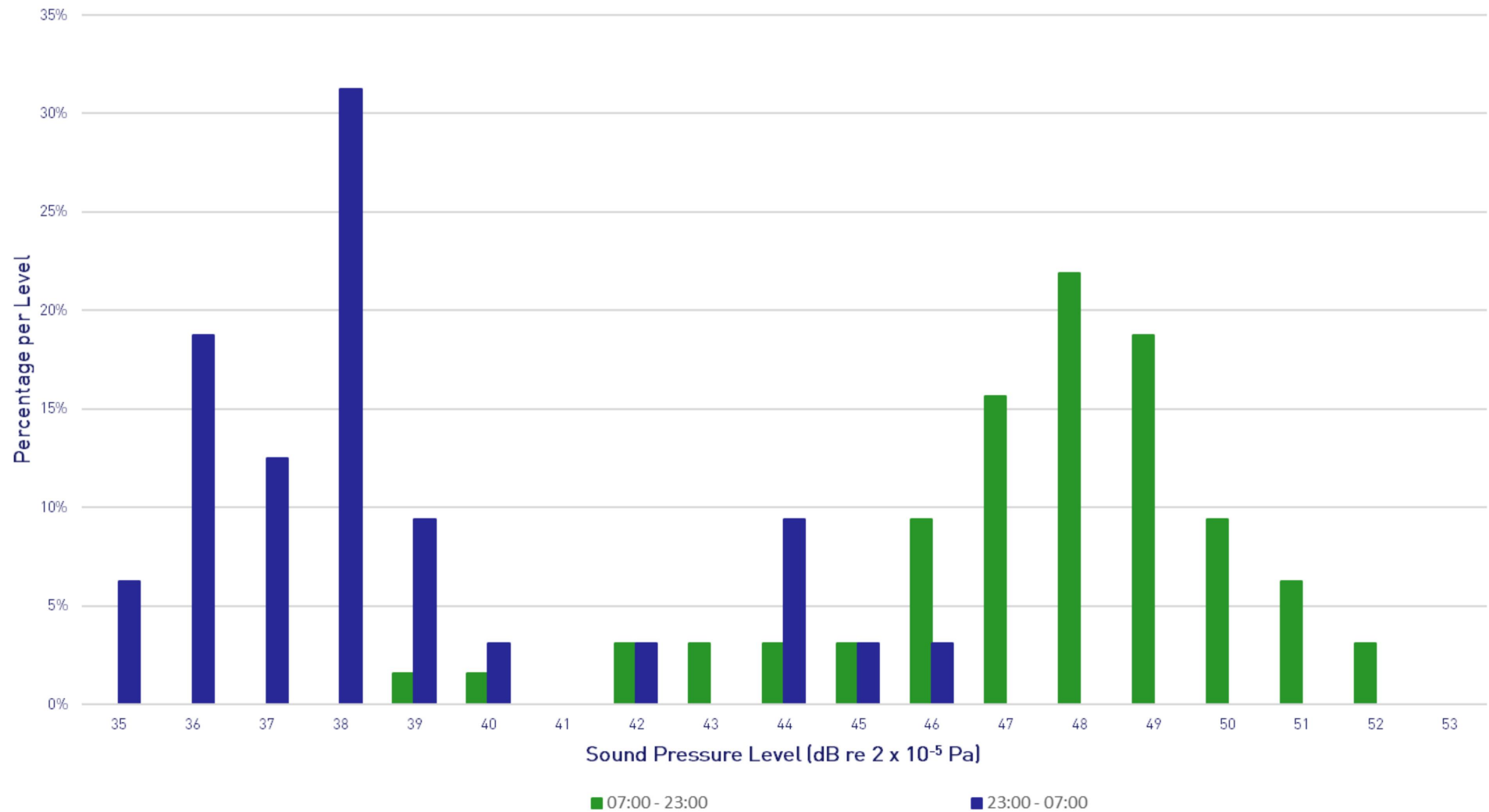
L_{A90,15 minutes} Histogram

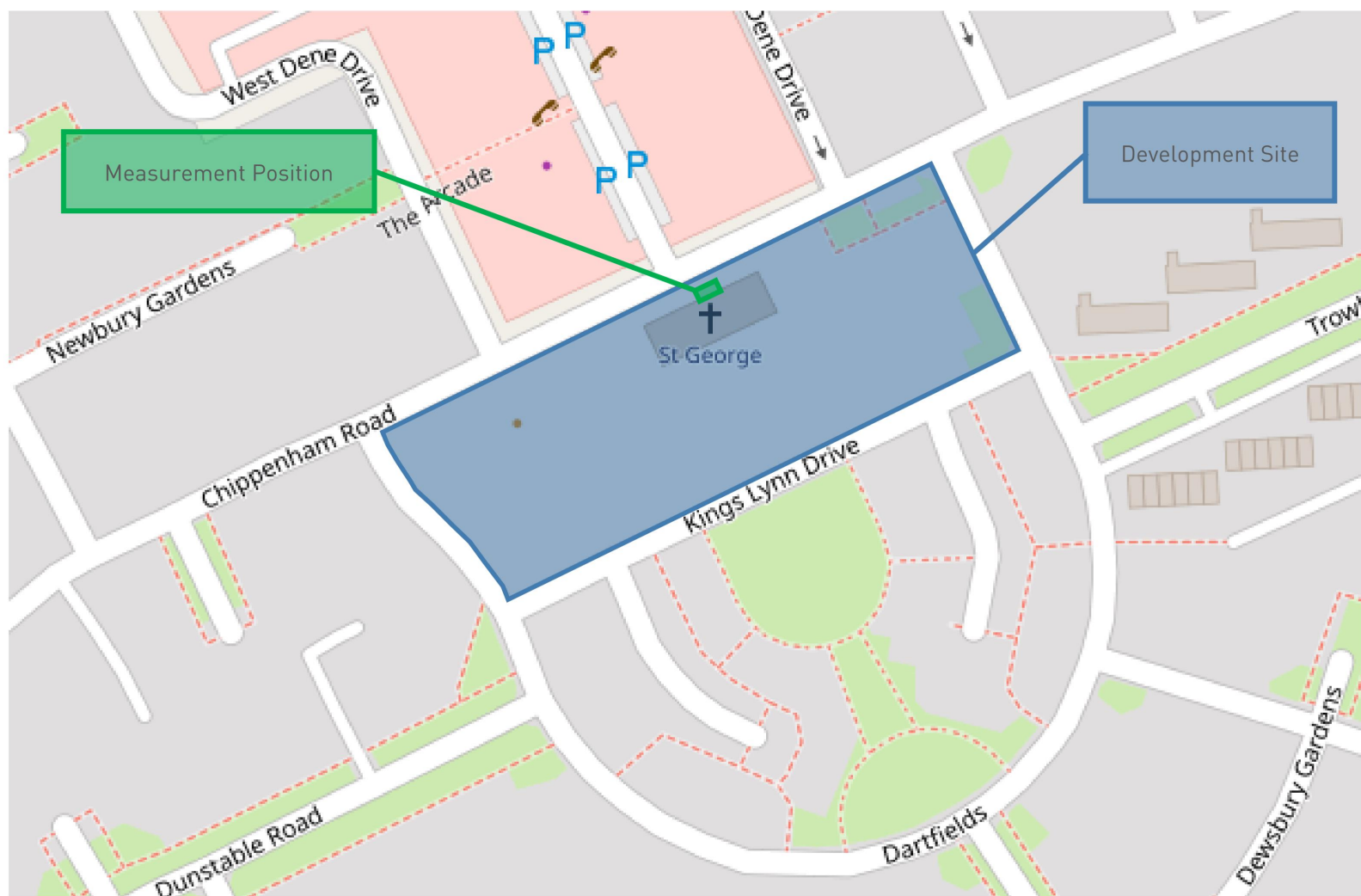
Church



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Graph 3





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Land Bounded by Chippenham Road, Kings Lynn Drive, Dartfields East and Dartfields West, Harold Hill, Romford, RM3 8HX
Site Plan

Figure 1

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