

# Noise Impact Assessment Report

The Proposed Development of 7 Elvetham Road  
Fleet, Hampshire GU51 4QL

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## EXECUTIVE SUMMARY

Sustain Quality have been commissioned to undertake a Noise Impact Assessment for a proposed residential development at 7 Elvetham Road in Fleet.

In order to take into account the reduced noise levels caused by Coronavirus restrictions, noise levels at the site have been measured in April 2020, amalgamated with previous survey data from June 2018 (normal conditions) and compared to relevant standards and guidance.

Noise modelling software has been used in order to predict noise levels at the building façade across daytime and night-time periods

The Noise Impact Assessment has determined that mitigation measures will be required but that with appropriate sound insulation measures and building construction, as exemplified within this report, the proposed residential premises are more than capable of achieving the guideline internal noise criteria contained in BS 8233:2014.

A minimum of 34dB Rw noise reduction is required for all glazed elements to be installed and passive vents to provide ventilation are readily available that meet or exceed the sound reduction required.

The fabric of the building (walls, roof) will be built in accordance with the relevant building regulations and it is predicted that these will meet the required internal noise levels.

The assessment has been based on worst case assumptions and shows that, in principle, the development will be able to implement suitable measures to ameliorate any noise and ensure that guideline internal noise criteria are met.

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## 1. INTRODUCTION

Sustain Quality have been commissioned by Form Design Group to undertake a Noise Impact Assessment for a proposed residential development at 7 Elvetham Road in Fleet.

This noise impact assessment report is submitted in support of a detailed planning application for the proposed development which comprises the demolition of the existing building on the site (the former care home) and the erection of a new three-storey residential block providing 14 flats with associated access, landscaping and parking.

Hart District Council (Local Plan, GEN 7 Policy for Noise Sensitive Developments) requires proposals for development of noises sensitive uses (particularly dwellings) that are located close to major roads or railway lines to take adequate measures for noise amelioration.

This document has been created with reference to national, regional and local legislation, policies and guidelines.

The purposes of this report are:

- To determine and assess prevailing ambient noise levels affecting the development proposal due to nearby noise sources (e.g. major roads, adjacent businesses etc).
- Based on the above, to present desired internal noise levels to be achieved within the premises in accordance with BS 8233:2014.
- To identify and recommend appropriate sound insulation requirements for the purposes of mitigating noise caused by prevailing noise sources such that internal noise levels are achieved.

Figure 1: Front view of 7 Elvetham Road



## 2. SUMMARY OF LEGISLATION, POLICY AND GUIDANCE

### 2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) published in July 2018 sets out the UK Government's planning policies for England. Planning law requires that applications for planning permission must be determined in accordance with the local development plan, unless material considerations indicate otherwise.

Section 15, Conserving and enhancing the natural environment states:-

**Paragraph 170:** Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution.

**Paragraph 180:** Planning policies and decisions should also 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.

### 2.2 Noise Policy Statement for England

The NPPF affirms that National Policy Statements form part of the overall framework of national planning policy and should be a material consideration in decisions on planning applications. The Noise Policy Statement for England (NPSE) came into force in 2010 to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

**Noise Policy Vision:** To promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

**Noise Policy Aims:** Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and where possible, contribute to the improvement of health and quality of life.

### 2.3 Planning Practice Guidance

The Planning Practice Guidance (PPG), published March 2014, provides advice on how to determine the noise impact on development:

Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and

- whether or not a good standard of amenity can be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

## 2.4 Hart District Local Plan 1996-2006

The Hart District Local Plan develops the relevant policies and general proposals of the Hampshire County Structure Plan, provides a detailed statutory basis for development control and provides a detailed statutory basis for co-ordinating and directing development.

GEN 7 'Policy for Noise Sensitive Developments' states that:

Proposals for development for noise sensitive uses, particularly dwellings, hotels and schools, located close to major roads, railway lines or other noise-generating uses will only be permitted where adequate measures are taken for noise amelioration.

The Council would not wish to see uses which are relatively sensitive to noise located close to existing uses that generate a lot of noise, without appropriate measures to reduce adverse impact of noise on the new development. Such noisy uses may include main roads, railways and air traffic

## 2.5 Hart Local Plan Strategy and Sites 2016-2032 Proposed Submission Version

### Policy NBE12 Pollution

361. Development proposals will need to consider the noise environment where developments are to be located, or any locations beyond the boundary of the site that they may affect. New development which will give rise to, or would be subject to, significant adverse effects of noise will not be supported.

362. Noise from road and rail traffic, aircraft, construction, entertainment venues, and commercial and industrial activities all have the potential to affect health and quality of life significantly and adversely if not properly controlled or planned for.

## 2.6 BS 8233:2014

BS8233:2014 'Guidance on sound insulation and noise reduction for buildings' is the current British Standard providing guidance for acoustic requirements within buildings. The Standard advises appropriate criteria and limits for different building types including dwellings as shown in the table below.

Table 2.1: BS8233 internal design criteria for dwellings

Activity	Location	07.00 to 23.00	23.00 to 07.00
Resting	Living room	35 dB <small>L<sub>Aeq</sub>, 16 hour</small>	-
Dining	Dining room/area	40 dB <small>L<sub>Aeq</sub>, 16 hour</small>	-
Sleeping (daytime resting)	Bedroom	35 dB <small>L<sub>Aeq</sub>, 16 hour</small>	30 dB <small>L<sub>Aeq</sub>, 8 hour</small>

Section G1 of BS 8233 advises that sound reduction is limited to 15dB where windows are open.



For gardens and terraces, the Standard states that it is desirable that the steady noise level does not exceed  $LA_{eq,T}$  50dB whilst a level of  $LA_{eq,T}$  55dB would be acceptable in noisier environments.

## 2.7 World Health Organization Guidelines for Community Noise

The World Health Organization (WHO) has developed guidelines designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in Table 2.3. For each specific environment the stated noise levels are the maximum noise levels to avoid the health effect noted.

Table 2.4: WHO Community Noise Guideline Values

Specific Environment	Critical health effects	$LA_{eq}$ dB	Time Base (hours)	$LA_{max}$ dB
Outdoor living area	Serious annoyance, daytime and evening	55	16	
	Moderate annoyance, daytime and evening	50	16	
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	
Inside bedrooms	Sleep disturbance, night- time	30	8	45
Outside bedrooms	Sleep disturbance, window open	45	8	60

The WHO ‘Guidelines for Community Noise’ offers advice with regard to setting noise criteria applicable to sleep disturbance. Section 4.2.3 specifies:

‘If the noise is not continuous,  $LA_{max}$  or SEL are used to indicate the probability of noise-induced awakenings. Effects have been observed at individual  $LA_{max}$  exposures of 45 dB or less. Consequently, it is important to limit the number of noise events with a  $LA_{max}$  exceeding 45 dB.’

The guidelines go on to state:

‘At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB  $LA_{eq}$  and 60 dB  $LA_{max}$ , so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.’

The sound insulation performance value of 15dB for a façade containing a partially open window accords with the guidance offered in BS8233:2014.

Accordingly, this assessment has utilised the 10th highest measured maximum noise level from the night-time period and allows for an assessment of a typical maximum noise level in determining façade sound insulation performance.



### 3. SITE OVERVIEW

The development site is located to the south of Elvetham Road, to the east of its junction with Wensley Drive.

The site has an area of around 0.15 hectares and is currently occupied by a detached two-storey building, a former care home, fronting onto Elvetham Road.

The site is located within the designated settlement area of Fleet.

Surrounding development comprises predominantly residential properties which are a mix of detached and semi-detached houses and blocks of flats. There are also some commercial premises in the vicinity of the site to the east along Elvetham Road and to the south-east along Fleet Road.

To the north, on the opposite side of Elvetham Road is the London to Southampton railway line which runs through a cutting, with the North Hants golf course beyond.

Vehicular and pedestrian access is provided from Elvetham Road.

Figure 3.1: Location of 7 Elvetham Road

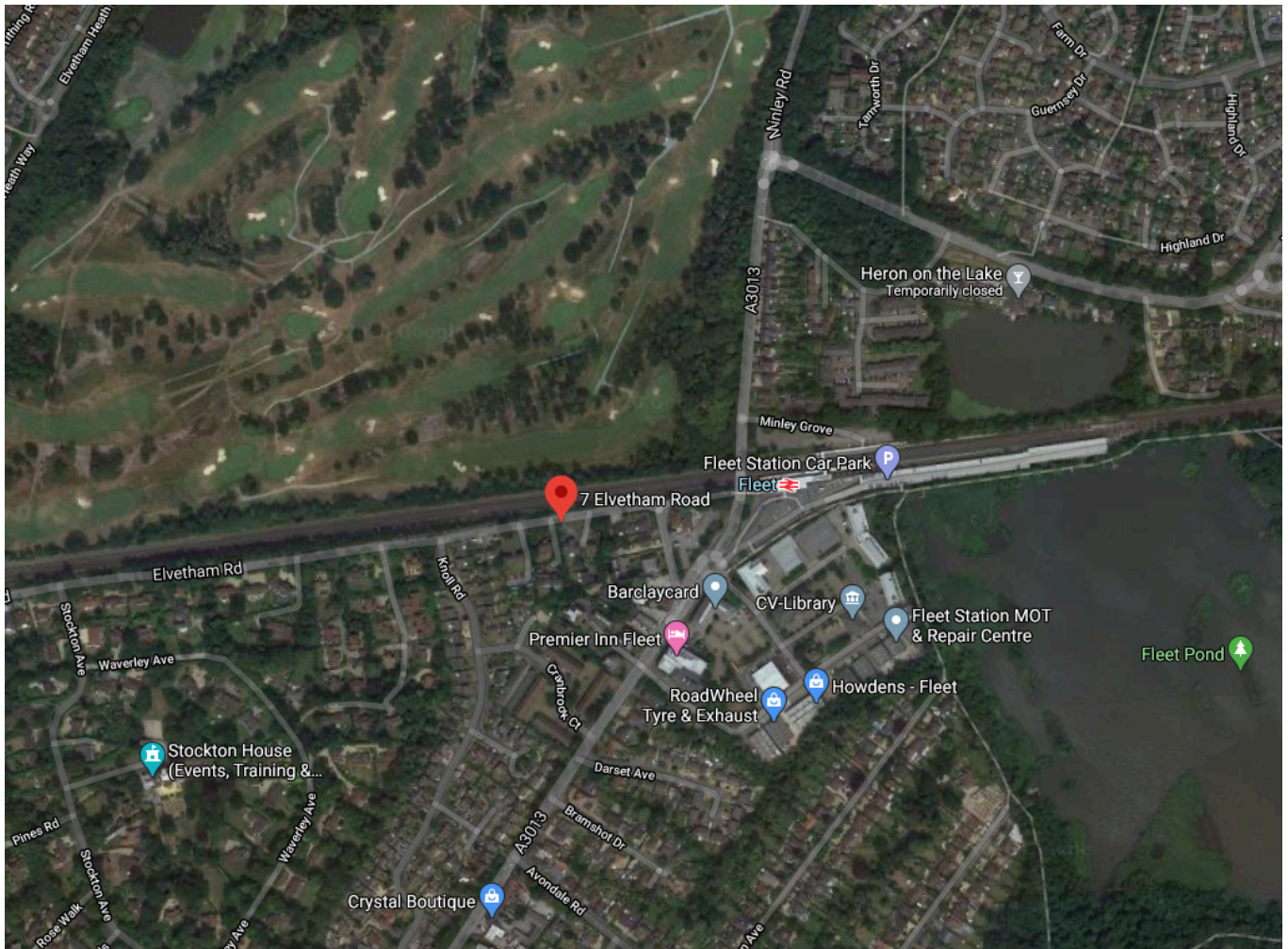


Figure 3.2: Site Plan and Elevation



## 4. NOISE SURVEY METHODOLOGY

Due to the Coronavirus pandemic, external noise conditions are currently not representative of the norm and it is uncertain when they will return to normal. As a consequence, the main sources of external noise affecting the proposed development, which are road and rail noise, are lower than usual. The risk of purely relying on a noise survey during the lockdown period of Coronavirus (or any post-lockdown ramp up of activity) is that any required noise attenuation requirements for the development may be under-represented.

The Covid-19 Planning Update issued in March by the Ministry of Housing, Communities and Local Government, advised council planning teams “to be pragmatic and continue, as much as possible, to work proactively with applicants and others....”

In response to this, the methodology for this assessment has been amended to incorporate validated past data and to ensure that survey activity during the lockdown period is conducted safely and within Government guidelines.

Fortunately for this development a prior noise survey was undertaken in June 2018 with ownership of the data and accompanying report being passed to the current developer. The methodology for this assessment has been as follows:-

- a. Review previous data from June 2018 and carry out site survey to determine whether local conditions have changed since June 2018.
- b. Repeat noise survey under Coronavirus lockdown conditions in April 2020 (operating safely and within government guidelines)
- c. Use worst case data from July 2018 or April 2020 to form basis of this report.

### 4.1 Review of July 2018 Report (attached in Appendix B)

A desk-based and physical review of the site and surrounding area in April 2020 has not identified any changed conditions when compared to the June 2018 survey data represented in the July 2018 report.

- There has been no relevant residential or commercial development in the immediate surrounding area
- There has been no alteration to the road network or road conditions (e.g. speed bumps)
- There has been no significant change to train timetables (excepting Coronavirus amendments)
- No other noise generating sources have been introduced.

### 4.2 Noise Survey 20<sup>th</sup> April 2020

An attended environmental noise survey was undertaken between 06.00 and 14.00 on the 20<sup>th</sup> April. The survey was calculated in accordance with the shortened procedure in the Calculation of Road Traffic Noise and included measurement of train pass-by noise whilst traffic noise levels were low.

One monitoring position was used to the front of the proposed development which was situated 3m from the kerbside of Elvetham Road.

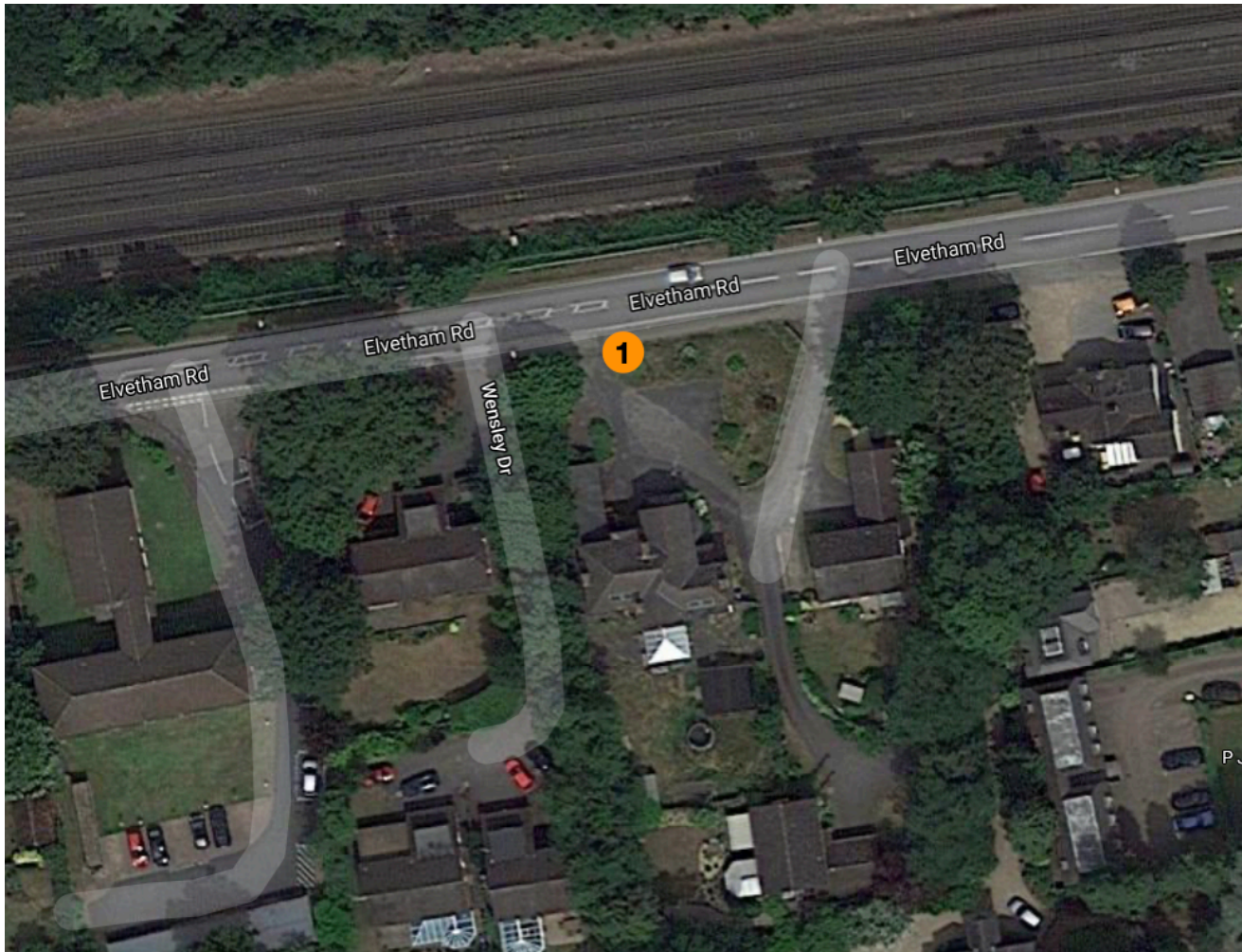


The location was selected as the most representative of likely noise to be experienced by the development and taking into account various access and safety restrictions.

Ambient, background and maximum sound pressure levels ( $LA_{eq}$ ,  $LA_{F10}$ ,  $LA_{F90}$  and  $LA_{Fmax}$  respectively) levels were measured throughout the noise survey with continuous recorded 15 minute periods.

The approximate measurement position is indicated in orange on the photograph below.

Figure 4.1: Noise Assessment Survey Location



The sound level meter was positioned on a tripod at ground level approximately 1.5 metres above ground level.

The position was considered to be in 'free-field' in line with BS 8233:2014 and representative of noise levels experienced at the front of the proposal. The position was chosen to gain noise from vehicles on the nearby roads and other significant noise sources, in particular rail.

The equipment used for the noise survey is summarised in the table overleaf.

Table 4.1: Noise Assessment Survey Locations

Name	Serial Number	Last Calibrated	Calibration Due
Casella Class 1 Environmental Noise Meter CEL-633A	1939799	Feb 2020	May 2020
Casella CEL-120/1 Acoustic Calibrator	1539331	Feb 2020	May 2020
Casella CEL-251 Pre-amplifier & Microphone			
Casella CEL-6718 Tripod			

### Measurement Equipment

The measurement equipment detailed above was used during the survey, all equipment complies with BS EN 60942:2003 i.e. a class 1 device. Equipment was field calibrated before and after the survey period. Equipment calibration certificates can be provided upon request.

### Weather Conditions

The following climate conditions were recorded for the site:

- Wind: 5-10 m/s.
- The weather was clear and dry
- Temperature: 11-17°C.

The above weather conditions are suitable for the measurement of environmental noise in accordance with BS:7445 Description and Measurement of Environmental Noise.

## 5. NOISE SURVEY RESULTS AND OBSERVATIONS

### 5.1 Results

The time-based ambient, background and maximum sound pressure levels at the measurement positions during the survey are provided in the table below.

Table 5.1: Summary of Noise Survey Results

Location	Measurement Start Time	Measured External Noise Level, $L_{Aeq}$	Measured External Noise Level, $L_{A90}$	Measured External Noise Level, $L_{AFmax}$
Kerbside at front of proposed development (1)	27th June 2018 11.23	63.9 dB $L_{Aeq}$	46.9 dB $L_{A90}$	79.0 dB $L_{AFmax}$
Kerbside at front of proposed development (1)	27th June 2018 12.23	64.3 dB $L_{Aeq}$	46.7 dB $L_{A90}$	
Kerbside at front of proposed development (1)	27th June 2018 13.23	63.7 dB $L_{Aeq}$	46.2 dB $L_{A90}$	
Kerbside at front of proposed development (1)	20th April 2020 11.02	59.8 dB $L_{Aeq}$	43.5 dB $L_{A90}$	77.1 dB $L_{AFmax}$
Kerbside at front of proposed development (1)	20th April 2020 12.02	61.7 dB $L_{Aeq}$	46.1 dB $L_{A90}$	
Kerbside at front of proposed development (1)	20th April 2020 13.02	61.9 dB $L_{Aeq}$	46.0 dB $L_{A90}$	

\*10th highest  $L_{AFmax}$  sound pressure level

BS 8233:2014 does not provide specific guidance on night-time  $L_{AFmax}$  criteria therefore this assessment is based on World Health Organisation (WHO) guidance that states for suitable sleeping conditions 45dB  $L_{AFmax}$  should not be exceeded by more than 10-15 times a night within a bedroom. As such, the  $L_{AFmax}$  noise level presented above is the 10th highest measure. This  $L_{AFmax}$  noise level then needs to be reduced to 45dB internally to comply with the night-time internal noise level.

It is noted that the external ambient noise level at the site exceeds the 55dB  $L_{Aeq}$  WHO's 'Guideline for Community Noise' (2009) values for external amenity space. BS 8233:2014 states that "For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB  $L_{Aeq,T}$ , with an upper guideline value of 55 dB  $L_{Aeq,T}$  which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."

## 5.2 Rail Traffic Noise Survey

Train pass-bys were measured during a typical early-morning weekday period in June 2018 (28/06/18 between 05.08 and 06.59).

The train pass-bys can be split between services that stop at Fleet Station and consequently are travelling slowly and those that pass straight through the station at speed.

### June 2018 Pass-By Data

Slow trains took on average 28 seconds to pass and the maximum noise was measured at 68.6 dB  $L_{Aeq}$ .

Fast trains took an average 11 seconds to pass and the maximum noise was measured at 75.0 dB  $L_{Aeq}$ .

### April 2020 Pass-By Data

Slow trains took on average 30 seconds to pass and the maximum noise was measured at 63.8 dB  $L_{Aeq}$ .

Fast trains took an average 9 seconds to pass and the maximum noise was measured at 74. dB  $L_{Aeq}$ .

## 5.3 Summary of Results

As shown in sections 5.1 and 5.2 above, there is a strong correlation between the noise patterns evidenced in the survey data in 2018 and 2020. In each case the 2020 data is lower, reflecting the reduced transport activity in April 2020 caused by the Coronavirus lockdown.

To ensure that the proposed development is able to implement adequate measures for noise amelioration in normal conditions, the worst case 2018 data should be used when calculating appropriate measures.

## 5.4 Calculated Daytime and Night-Time Noise levels

Modelling software SoundPLAN 7.3 was used to determine the impact of noise on the proposed site. A noise model was constructed to calculate façade and external noise levels.

Table 5.2: Calculated Daytime and Night-Time Noise Levels

Source	Assessment Period	Calculated External Noise Level, $L_{Aeq}$	Calculated External Noise Level, $L_{AFmax}$
Road	Daytime (07.00-23.00)	66 dB $L_{Aeq}$	
	Night-time (23.00-07.00)	57 dB $L_{Aeq}$	79 dB $L_{AFmax}$
Rail	Daytime (07.00-23.00)	51 dB $L_{Aeq}$	
	Night-time (23.00-07.00)	43 dB $L_{Aeq}$	72 dB $L_{AFmax}$



## 6. SITE SUITABILITY FOR RESIDENTIAL DEVELOPMENT

With appropriate sound insulation measures and building construction, the proposed site is more than capable of achieving the recommended internal noise levels inside the residential premises. The construction of the building is approaching a detailed design stage therefore this section of the report provides recommendations of the building fabric required to achieve the desired internal noise levels.

Sound reduction performance calculations have been undertaken to specify the minimum performance required from glazed and non-glazed elements as outlined in the table below. The specification should be adopted to achieve the night-time level (23:00 - 07:00 hours) for bedrooms, 30dB LAeq,8hour, and the day time (07:00 - 23:00) for living rooms and bedrooms, 35dB LAeq,16hour. LAFmax values for the night-time period have also been applied to the calculated sound reduction index of the glazed element to confirm the limit of 45 LAFmax is also achieved for single events during the night.

Suggested glazing units and building element specifications other than those provided below may also be suitable. The analysis is provided to demonstrate that a design solution is feasible at the site for the purposes of meeting the requirements of the Local Authority.

### Façade Elevations Required Sound Insulation Performance

Period	Calculated External Noise Level, dB	Internal Noise Level Requirement, dB	Minimum Sound Reduction Performance Requirement, dB Rw
Daytime (07.00-23.00)	66 dB LAeq	35 LAeq	31
Night-time (23.00-07.00)	57 dB LAeq	30 LAeq	27
Night-time (23.00-07.00)	79 dB LAFmax	45 LAFmax	34

### 6.1 Non-glazed elements

The non-glazed façade construction elements would be anticipated to provide a sound reduction performance of at least the figures shown in the table below when tested in accordance with ISO 10140-2:2010.

#### Non-glazed elements assumed sound reduction performance

Element	Octave band centre frequency SRI, dB					
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Non-glazed element SRI	36	40	41	45	52	52

Given the typical extensive build and construction of the external walls, it is predicted that this element would provide significant attenuation to achieve the internal noise levels.

## 6.2 Glazed Elements

The windows, and any trickle ventilators, are normally the weakest part of a façade. A minimum of 34dB Rw noise reduction is required for all glazed elements to be installed. The performance is specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents. Glazing performance calculations have been based on the measured ambient (LAeq) noise levels as recommended by BS 8233:2014 and also for maximum (LAFmax) night-time noise levels.

An example glazing specification which can attain this sound insulation requirements would be 6mm glass/12mm air space/6mm glass which could provide sound insulation of 34dB. Requirements of up to 37dB RW can be attained by products in common ranges provided by manufacturers such as Dual Seal or Pilkington.

However, with a partially open window, the internal noise levels for certain habitable rooms facing Elvetham Road could be exceeded. Accordingly it is necessary to consider an alternative ventilation scheme which does not require the opening of windows in those rooms to provide fresh air flow and background ventilation (purge ventilation will require these windows remain openable).

At the time of writing, full details regarding any ventilation strategy are not available. Notwithstanding this, the Building Regulations' Approved Document F (2010) presents whole dwelling ventilation rates. In this context ventilation can be provided by passive wall or window ventilators. The Building Research Establishment (BRE) has published an Information Paper on the acoustic performance of such passive ventilation systems. 'IP4/99: Ventilators: Ventilation and Acoustic Effectiveness' (October 1999) details a study into the sound reduction performance of fourteen different window mounted trickle ventilators and seven different through-wall passive ventilators. The measured sound reduction performance, after taking into account flanking sound paths (i.e. sound paths that do not travel directly through the vent) and the effective area of the ventilator, ranged up to 46dB Dne,w. Attenuation performance for ventilation openings is specified in terms of Dne,w. Passive vents to provide ventilation are therefore available that meet or exceed the sound reduction required by the glazing elements and can be constructed into the proposal accordingly.

An example of a suitable trickle ventilator for glazing could be the Greenwood 1600DN that gives 37.7dB Dne,w sound attenuation when open and 46dB Dne,w when closed.

## 6.3 Roof

Typical construction and sound insulation values of roofs can be gained from BS8233:2014; for example, a traditional pitched roof with tiles on felt with 100mm mineral wool on plasterboard ceiling has an SRI (Sound Reduction Index) of approximately 43dB Rw. A flat timber joist roof with asphalt on boarding and 12mm plasterboard ceiling with thermal insulation has an SRI of approximately 45dB Rw. Given the typical build and construction of roofs will be in accordance with the Building Regulations, it is predicted that this element would achieve the internal noise levels.

## 7. CONCLUSIONS

Sustain Quality have been commissioned to undertake a Noise Impact Assessment for a proposed residential development at 7 Elvetham Road in Fleet.

In order to take into account the reduced noise levels caused by Coronavirus restrictions, noise levels at the site have been measured in April 2020, amalgamated with previous survey data from June 2018 (normal conditions) and compared to relevant standards and guidance.

Noise modelling software has been used in order to predict noise levels at the building façade across daytime and night-time periods

The Noise Impact Assessment has determined that with appropriate sound insulation measures and building construction, as exemplified within this report, the proposed residential premises are more than capable of achieving the guideline internal noise criteria contained in BS 8233:2014.

A minimum of 34dB Rw noise reduction is required for all glazed elements to be installed and an example specification is provided. Passive vents to provide ventilation are available that meet or exceed the sound reduction required by the glazing elements and can be constructed into the proposal accordingly.

The fabric of the building (walls, roof) will be built in accordance with the relevant building regulations and it is predicted that these will meet the required internal noise levels.

The assessment has been based on worst case assumptions and shows that, in principle, the development will be able to implement suitable measures to ameliorate any noise and ensure that guideline internal noise criteria are met.

## GLOSSARY OF TERMS

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ( $20 \times 10^{-6}$ Pascals).
Sound Pressure Level (Lp)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L <sub>A</sub> or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
L <sub>Aeq</sub>	The A-weighted equivalent continuous noise level. This is the sound level that is equivalent to the average energy of noise recorded over a given period.
L <sub>AFn</sub>	The noise level exceeded for n% of the time over a given period T. e.g. L <sub>AF90</sub> is the noise level exceeded for 90% of the time (background noise).
L <sub>AFmax</sub>	The maximum noise level measured.