Evolved Acoustics

Environmental Noise Assessment

For Proposed Caravan Site

Land North of Girder Bridge, Gay Street Lane, North Heath

Client

Manorwood

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EV2648-01-A

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Document Control and Revision History

Report Reference	EV2648-01-A
Project	Proposed Static Caravan Park Land North of Girder Bridge, Gay Street Lane, North Heath
Client	Manorwood
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Rev	Date of Issue	Checked	Authorised	Comment
A	19/10/26	FR	TH	First issue

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1. Introduction

1.1 Scope

Evolved Acoustics Limited was commissioned in September 2026 to undertake an Environmental Noise Assessment at Land North of Girder Bridge, Gay Street Lane, North Heath, RH20 1DJ.

The assessment has been undertaken to inform a planning appeal relating to the development of the site into a residential caravan site comprising 6 no. static caravans.

Environmental noise levels measured at the site have been used to carry out an initial site noise risk assessment and to evaluate external and internal noise levels. An assessment of noise has then been carried out using BS 8233:2014 [1] and Professional Practice Guidance on Planning & Noise: 2017 (ProPG:2017) [2]. Advice on the site layout, sound insulation and ventilation strategy has been provided based on the outcomes of the assessment as documented within an Acoustic Design Statement (ADS).

1.2 Planning Context

The planning application for the proposed static caravan site was refused by Planning Committee despite an officer recommendation for approval. One reason for refusal concerned the potential for noise from the adjoining railway line to significantly affect the residential amenity of future occupiers. Horn use associated with pedestrian crossings forms part of this concern. This noise assessment has therefore been prepared to support the planning appeal and assess the suitability of the site for the proposed use in relation to railway noise.

[1] British Standards Institution (BSI). BS 8233:2014 Guidance on sound insulation and noise reduction for buildings. 2014.
[2] Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH). ProPG: Planning & Noise. New Residential Development. 2017.

2. Noise Policy and Criteria

2.1 British Standard 8233:2014

BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* sets out acoustic design advice and noise criteria for buildings.

Set out in Table 4 of BS 8233 and reproduced below are the guideline internal noise criteria for residential dwellings.

Activity	Location	07:00 to 23:00	23:00 – 07:00
Resting	Living Room	35 dB *L*Aeq,16hr	-
Dining	Dining Room/Area	40 dB *L*Aeq,16hr	-
Sleeping	Bedroom	35 dB *L*Aeq,16hr	30 dB *L*Aeq,8hr

Table 2.1: Indoor Ambient Noise Levels for Dwellings (Table 4 of BS 8233)

NOTE 1 Table 4 provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The levels shown in Table 4 are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in Table 4.

NOTE 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.

NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the facade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.

NOTE 6 Attention is drawn to the Building Regulations [30, 31, 32].

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

3. Site Location and Proposed Development

3.1 Site Description

The site currently comprises an open field in North Heath, accessible from Gay Street Lane. The site runs parallel to the London to Portsmouth Railway Line. The area surrounding the site comprises mainly open grassland and agricultural land.

The location of the site is shown on Figure A1 of Appendix A.

3.2 Proposed Development

The design proposal is for 6 no. static caravans, distributed across the length of the site. Access to the site is to be provided off Gay Street Lane.

The proposed site plan can be found in Figure A2 of Appendix A.

3.3 Static Caravan Specification

Whilst the final static caravan specification is yet to be determined, it is understood that the selected model will comply with BS 3632:2023. Under Clause 4.3.4 – Sound Insulation, BS 3632 states:

"*To minimize the transmission of airborne noise through the residential park home structure, the external wall construction (excluding doors, windows and ventilation openings) shall have a sound reduction index (R) of 33dB over a frequency range of 100 Hz to 3150 Hz when tested in an acoustic laboratory in accordance with BS EN ISO 10140-2.*"

As the doors, windows and ventilation openings are excluded from the standard requirements, the sound insulation requirements of these elements will be determined as part of this assessment.

4. Environmental Noise Survey

4.1 Continuous Unattended Noise Monitoring

An environmental noise survey was carried out at the site over a period spanning seven calendar days in September 2026. A summary of the main details of the noise survey is provided in Table 4.1.

Position	Start Date & Time	End Date & Time	Description of Measurement Position
MP1	Wed 23/09/26 14:30 hrs	Tues 29/09/26 11:55 hrs	Microphone positioned 1.4m above ground level, eastern extent of the site.

Table 4.1: Summary of Unattended Noise Survey Details

The monitoring position is marked MP1 on Figure A3 of Appendix A. This position was slightly closer to the railway than the proposed caravan positioning, however this was necessary to ensure the security of the equipment. Therefore, whilst MP1 was not directly representative of the proposed caravan positioning, the results obtained at this position have been used in conjunction with attended monitoring data to model and assess noise levels across the site.

The sound level meter (SLM) was configured to measure ambient ($L_{Aeq,5min}$), background ($L_{A90,5min}$) and maximum ($L_{Amax,F}$) noise levels.

4.2 Attended Noise Monitoring

Attended noise surveys were undertaken on 23rd and 29th September 2026. The surveys comprised a total of ten 15-minute attended noise measurements to assist in identifying any variation in noise levels across the development site. Logging intervals were set to 10s and the SLM was synchronised with the SLM at MP1 to enable a direct comparison. Observations were made on the noise climate and the sources governing the ambient ($L_{Aeq,T}$) and maximum (L_{AFmax}) noise levels. Octave frequency band levels were also obtained.

The attended noise monitoring positions are labelled MP2 to MP6 on Figure A3 of Appendix A.

4.3 Equipment

The noise measurements were undertaken using Rion and Svantek SLMs, rated Class 1. A summary of the main details of the noise monitoring equipment is provided in Table 4.2.

Type	Make	Model	Serial No.	Date of Last Laboratory Calibration
Class 1 SLM	Rion	NL-32	00513572	17/12/2025
Class 1 SLM	Svantek	SV971A	121165	18/12/2024

Table 4.2: Equipment Details

Copies of the calibration certificates for the noise monitoring equipment can be provided upon request.

The unattended SLM was housed in a protective casing. The microphone was fitted with a protective windscreen and connected to the SLM using an extension cable and extension pole.

The attended SLM was mounted on a tripod 1.4m above ground level with a windscreen protecting the microphone.

4.4 Field Calibration

Calibration checks were performed on all noise monitoring equipment before and after the surveys using a Castle dBCal GA611 acoustic calibrator. The calibration checks indicated that no significant drift occurred throughout the measurements.

4.5 Weather Conditions

Weather conditions during the setup and attended noise monitoring on 23rd September were dry and sunny with wind speeds around 1 $m.s^{-1}$. The temperature was around 25 °C and the humidity was around 50%.

Weather conditions during the attended noise monitoring on 29th September were dry and sunny with wind speeds around 2$m.s^{-1}$. The temperature was around 25 °C and the humidity was around 65%.

A record of the weather conditions for the unattended survey period has been obtained from a nearby meteorological monitoring position. The weather record is shown in Appendix B. Weather conditions

were generally satisfactory for outdoor noise monitoring, with relatively low wind speeds, no precipitation and average daily temperatures ranging between 14 °C and 20 °C.

5. Noise Survey Results

5.1 Continuous Noise Survey Results

The results of the noise survey undertaken at position MP1 are summarised in Table 5.1 with a time history graph provided in Appendix C.

The average ambient ($L_{Aeq,T}$) and background ($L_{A90,T}$) levels are shown for each day and night-time period, with the average levels across the full survey period shown on the bottom row of the table. The table also includes the range of maximum ($L_{Amax,F}$) levels for each night-time period.

Date	Measured Noise Levels, dB [A]					
	DAYTIME (07:00 – 23:00 hrs)		NIGHT-TIME (23:00 – 07:00 hrs)			
	$L_{Aeq,5min}$	$L_{A90,5min}$	$L_{Aeq,5min}$	$L_{A90,5min}$	Night Maxima (L_{AFmax})	
					Range	Average
Wed 23/09 [B]	53	39	45	25	79 - 25	51
Thu 24/09	52	35	45	25	83 - 28	49
Fri 25/09	52	38	46	25	90 - 26	48
Sat 26/09	52	37	41	24	78 - 31	47
Sun 27/09	49	37	45	24	80 - 30	48
Mon 28/09	52	35	45	24	78 - 32	46
Tue 29/09 [B]	53	36	-	-	-	-
Average	**52**	**37**	**45**	**25**	**81 - 29**	**48**

Table 5.1: Noise Levels at Position MP1

Notes:
[A] free-field noise levels, dB re $2x10^{-5}$ Pa
[B] incomplete daytime period due to setup / retrieval of equipment

The results presented in Table 5.1 show that the average daytime ambient level was 52 dB $L_{Aeq,16hr}$ whilst the average night-time level was 45 dB $L_{Aeq,8hr}$ (free-field).

5.2 Attended Noise Survey Results

The results of the attended noise surveys undertaken in September 2026 are shown in Table 5.2 below.

Date	Position	Start Time	Duration *T* (mins)	Measured Sound Levels, dB [A]		
				Maximum L_{AFmax}	Ambient $L_{Aeq,T}$	Background $L_{A90,T}$
Wed 23/09/26	MP2	12:30	15	61	44	39
	MP3	12:50	15	86	59	41
	MP4	13:05	15	78	54	38
	MP2	13:25	15	84	58	41
	MP3	13:45	15	65	45	39
	MP4	14:05	15	89	61	38
Tue 29/09/26	MP5	12:00	15	77	54	43
	MP6	12:20	15	79	54	40
	MP5	12:40	15	77	51	40
	MP6	13:00	15	82	56	36

Table 5.2: Attended Environmental Noise Survey Results

Notes:
[A] free-field sound levels, dB re $2x10^{-5}$ Pa.

The primary sources of noise governing the ambient ($L_{Aeq,T}$) levels at the site were passing trains, together with the distant hum of road traffic on the A24 running to the east and occasional vehicles on Gay Street Lane. Secondary noise sources included sounds of birdsong and farm animals, as well as aircraft associated with Gatwick Airport. The maximum (L_{AFmax}) noise levels were attributable to trains.

The contribution of train horns to measured railway noise levels varied with the position of the train when the horn was sounded. Maximum noise levels (L_{AFmax}) were generally governed by wheel–rail

interaction. However, where horns were sounded close to the monitoring position, horn noise determined the maximum level recorded during the corresponding train pass-by.

5.3 Analysis of Night-time Noise Events

The unattended noise survey data indicate that train movements generally occurred between approximately 06:30 and 23:45 hrs on most days, commencing slightly later on Sundays. Train-related maximum noise events therefore occurred during both the daytime and night-time assessment periods.

ProPG indicates that individual noise events should not normally exceed 45 dB L_{AFmax} within bedrooms more than ten times per night. For this assessment, however, the selection of a design maximum has also taken account of the recurring nature of railway noise associated with scheduled services. The approach therefore seeks to control regularly occurring train-related events to no more than 45 dB L_{AFmax} internally, rather than selecting a lower external design level solely on the basis that a limited number of exceedances could be accommodated.

On this basis, an external design-case maximum noise level of **83 dB L_{AFmax}** has been adopted for assessment purposes. This value represents the upper range of maximum noise levels, attributable to the railway, recorded during the night-time period. Attended survey observations indicate that adoption of this level would account for both wheel–rail interaction and most instances of train horn sounding.

There was one recorded instance of night-time noise levels reaching 90 dB L_{AFmax}. Given its isolated occurrence within the survey dataset, this event has been treated as exceptional and has not been adopted as the design maximum. The assessment therefore adopts 83 dB L_{AFmax} as a representative upper-range value.

5.4 Summary of Environmental Noise Levels

The attended noise monitoring results were compared with those obtained at the fixed unattended monitoring position, MP1, to assess the spatial variation in railway noise levels across the width of the site.

The comparison indicated little variation in noise levels between monitoring positions. Although MP1 was closest to the railway, it is likely to have benefited from some acoustic screening by the embankment. Ambient noise levels ($L_{Aeq,15min}$) at MP2–MP6 were generally approximately 1 dB lower than those at MP1, with no difference in some instances. On this basis, the overall daytime and night-time noise levels ($L_{Aeq,T}$) measured at MP1 have been adopted for assessment purposes without any adjustment applied. No consistent spatial trend was evident in the maximum sound levels (L_{AFmax}), which were influenced by individual noise events, including horn sounding, occurring at varying locations along the railway.

The noise levels adopted for assessment purposes are summarised in Table 5.3.

Time Period	Noise Parameter	External Level (free-field) (dB)
Daytime (07:00 – 23:00 hrs)	$L_{Aeq,16hr}$	52
Night-time (23:00 – 07:00 hrs)	$L_{Aeq,8hr}$	45
	L_{AFmax}	83

Table 5.3: Summary of Free-Field Environmental Noise Levels for Assessment

6. Noise Assessment

6.1 ProPG Initial Site Noise Risk Assessment

ProPG: Planning & Noise provides an initial site noise risk assessment tool which provides an indication of the feasibility of a site with regard to noise depending on the external daytime and night-time ambient ($L_{Aeq,T}$) noise levels.

The daytime and night-time noise levels of 52 dB $L_{Aeq,16hr}$ and 45 dB $L_{Aeq,8hr}$, respectively, fall within the 'low' noise risk range.

ProPG advises that 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 Acoustic Design Statement (ADS) which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

Whilst the ProPG initial risk assessment is based on ambient ($L_{Aeq,T}$) noise levels, the maximum noise levels (L_{AFmax}) may be the more relevant indicator of potential noise effects, especially during the night-time.

6.2 BS 8233 Internal Noise Level Assessment

The simple calculation method in Annex G of BS 8233:2014 has been used to estimate internal noise levels within a sample of habitable rooms, based on the measured environmental noise levels.

Based on BS 3632 minimum requirements, the assumed sound reduction of the external walls of the caravans is assumed to be 33 dB and the same value has been assumed for the roof. Standard double glazing and trickle ventilators are assumed for initial assessment purposes.

If partially open windows are relied upon for background ventilation, the sound insulation is reduced to approximately 15 dB.

An assessment of internal noise levels in habitable rooms is presented in Table 6.1, which considers both windows-open and windows-closed scenarios.

This assessment is based on the adopted external noise levels and does not consider any natural attenuation of sound for windows facing away from the noise source, nor any other noise mitigation.

Zone	Room	Time Period	Noise Parameter	External Level (free-field)	Target Internal Level (dB)	Internal Noise Level (dB)		Target Noise Criterion Achieved?	
						Windows Open [A]	Windows Closed [B]	Windows Open	Windows Closed
Whole Site	Living Areas	Daytime	$L_{Aeq,16hr}$	52	35	37	19	No	Yes
	Bedrooms	Daytime	$L_{Aeq,16hr}$	52	35	37	19	No	Yes
		Night	$L_{Aeq,8hr}$	45	30	30	12	Yes	Yes
			L_{AFmax}	83	45	68	50	No	No

Table 6.1: BS 8233 Internal Noise Level Assessment

Notes:

[A] based on an assumed sound reduction of 15 dB with an open window.

[B] based on an assumed sound reduction of 33 dB with closed windows (typical specification).

6.3 BS 8233 Assessment Outcomes

Windows Open

Table 6.1 demonstrates that the internal noise criteria of BS 8233:2014 would not be achieved with windows open for natural ventilation. The ventilation strategy will therefore need to ensure that sufficient ventilation rates can be achieved with windows closed for noise control purposes.

Windows Closed

The assessment presented in Table 6.1 demonstrates that, using a typical static caravan specification, with windows closed, the desirable criteria of BS 8233:2014 would be achieved with ambient noise levels reduced to below 35 dB $L_{Aeq,16hr}$ during the daytime (07:00 – 23:00 hrs) and below 30 dB $L_{Aeq,8hr}$ at night (23:00 – 07:00 hrs).

However, the predicted internal maximum noise level exceeds the 45 dB L_{AFmax} target. This indicates that an enhanced sound-insulation specification will be required which exceeds the BS 3632 minimum requirement of *R*w 33 dB. This enhanced specification is covered in the Acoustic Design Statement and includes the walls, roof, glazing and any ventilators.

6.4 Noise Levels in External Amenity Areas

BS 8233:2014 recommends a guideline desirable limit of 50 dB $L_{Aeq,T}$ in traditional external areas used for amenity space, such as gardens and patios, with a guideline upper limit of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

The results of the noise survey indicate that daytime environmental noise levels in the external amenity areas are expected to be up to 52 dB $L_{Aeq,16hr}$, falling within the acceptable range.

As the external noise levels only marginally exceed the guideline desirable limit and fall within the acceptable limit of BS 8233, mitigation of noise in external areas is not considered to be necessary or proportionate; acoustic screening is not likely to be effective given the elevated position of the railway, as discussed further in Section 7.

7. Acoustic Design Statement (ADS)

7.1 Site Layout and Orientations

The noise survey results indicate that there would be little acoustic benefit in positioning the caravans further away from the railway.

However, where possible, the caravans should be oriented so that the bedroom windows do not face directly onto the railway.

Acoustic modelling has been undertaken based on the proposed site layout, which indicates that the south and north-facing elevations will likely benefit from a reduction of around 3-5 dB $L_{Aeq,T}$ compared to the east-facing elevation. The reduction of L_{AFmax} noise events attributable to trains will depend on where they occur, however where windows are shielded from at least part of the railway, the likelihood of some noise events being reduced in level is increased.

7.2 Acoustic Barrier Feasibility

Acoustic screening, such as acoustic fencing, is not recommended as a mitigation measure. Given the elevated position of the railway, a barrier would need to be substantial in height to interrupt the line of sight between passing trains and the proposed caravans and provide effective noise attenuation.

7.3 Caravan Sound Insulation Specification

Information available online suggests that static caravans are available with walls and roofs achieving up to 45 dB Rw, a significant improvement upon the 33 dB Rw minimum standard of BS 3632:2023. For the site in question, a minimum of 40 dB Rw is recommended. The glazing and other elements have been assessed separately.

Table 7.1 summarises the recommended minimum sound attenuation ratings for the caravan walls and roof, glazing and any background ventilators. Example specifications to achieve these values are provided in the table; however, any alternative products may be used which fulfil the specified minimum ratings.

Construction Element	Minimum Rating	Example Product
Caravan Walls & Roof	40 dB Rw	N/A
Glazing to Habitable Room	37 dB Rw	6/16/8mm Double Glazing
Façade Ventilators to Habitable Rooms (if any)	42 dB Dn,e,w	Titon V75 / C50 Acoustic Trickle Vent

Table 7.1: Minimum Sound Insulation Requirements

Based on typical glazed area dimensions for residential static caravans, the above specifications should ensure that typical maximum individual noise events are reduced to no greater than 45 dB L_{AFmax} in bedrooms. The overall daytime and night-time ambient noise levels ($L_{Aeq,T}$) would likely be reduced to comfortably within the desirable limits of BS 8233:2014 inside habitable rooms of caravans, using the above specification.

7.4 Ventilation and Mitigation of Overheating Strategy

Based on the external noise levels at the site, the internal noise criteria are not likely to be achieved with windows open for prolonged periods. Therefore, a ventilation strategy which eliminates or significantly reduces occupant reliance on open windows for ventilation is likely to be required.

Options for ventilation may include continuous mechanical extraction and potentially comfort cooling or Air Conditioning (AC) systems. The main requirements of the ventilation strategy are to achieve the following aims:

- Provide adequate background ventilation rates with windows closed;
- Provide overheating mitigation equivalent or better than open windows; and
- Produce noise levels which do not compromise desirable internal noise levels in bedrooms and living areas.

As a minimum, the system should be designed to achieve a 30 dB $L_{Aeq,T}$ self-generated noise limit in habitable rooms, ideally 24-26 dB $L_{Aeq,T}$ where compatible with the overall design.

Note: the internal noise level targets are generally not applicable under “purge ventilation” conditions, as this should only occur occasionally, for example to rapidly remove odours.

If the chosen ventilation strategy removes the requirement for any background ventilators in the façade, the minimum sound attenuation ratings ($D_{ne,w}$) in Table 7.1 can be disregarded.

8. Summary and Conclusions

An environmental noise assessment has been undertaken for the proposed residential caravan park at Land North of Girder Bridge, Gay Street Lane, North Heath.

The principal noise source affecting the site is the adjacent railway line including both noise from wheel-rail interaction and the routine sounding of train horns, during approach, for warning purposes.

A noise survey comprising both unattended and attended noise monitoring has been carried out at the site. The results of the surveys have been used to calculate internal noise levels in the static caravans, based on the standard sound insulation specifications required for caravans under BS 3632:2023.

Internal noise levels were predicted to exceed BS 8233:2014 desirable limits and associated maximum (L_{AFmax}) noise criteria during the night-time period, indicating a requirement for an enhanced sound insulation specification. Recommended minimum acoustic performance requirements for the caravan walls and roof, glazing and any background ventilators have been provided, which would reduce noise ingress levels to within the target criteria. Other measures, such as recommended caravan orientations, are provided together with the sound insulation requirements in Section 7.

As the target noise levels would not be achieved with windows open for prolonged periods, a ventilation strategy should be employed for the caravans which eliminates or significantly reduces occupant reliance on open windows. The strategy may involve the use of systems such as mechanical ventilation, comfort-cooling and/or AC, and should provide adequate ventilation rates and mitigation of overheating whilst generating acceptable levels of noise. Further details are set out in Section 7 of this report.

The expected noise levels in the external amenity areas of the caravan site are marginally above the guideline desirable limit of BS 8233:2014 but within the guideline acceptable limit. Given the geometry of the site and limited options for effective acoustic screening, these levels are considered an acceptable compromise and no specific mitigation of noise in external areas is recommended.

Provided the recommendations of this assessment are implemented, adverse impacts due to the noise are expected to be mitigated and minimised in line with the National Planning Policy Framework (NPPF).

Appendix A – Figures

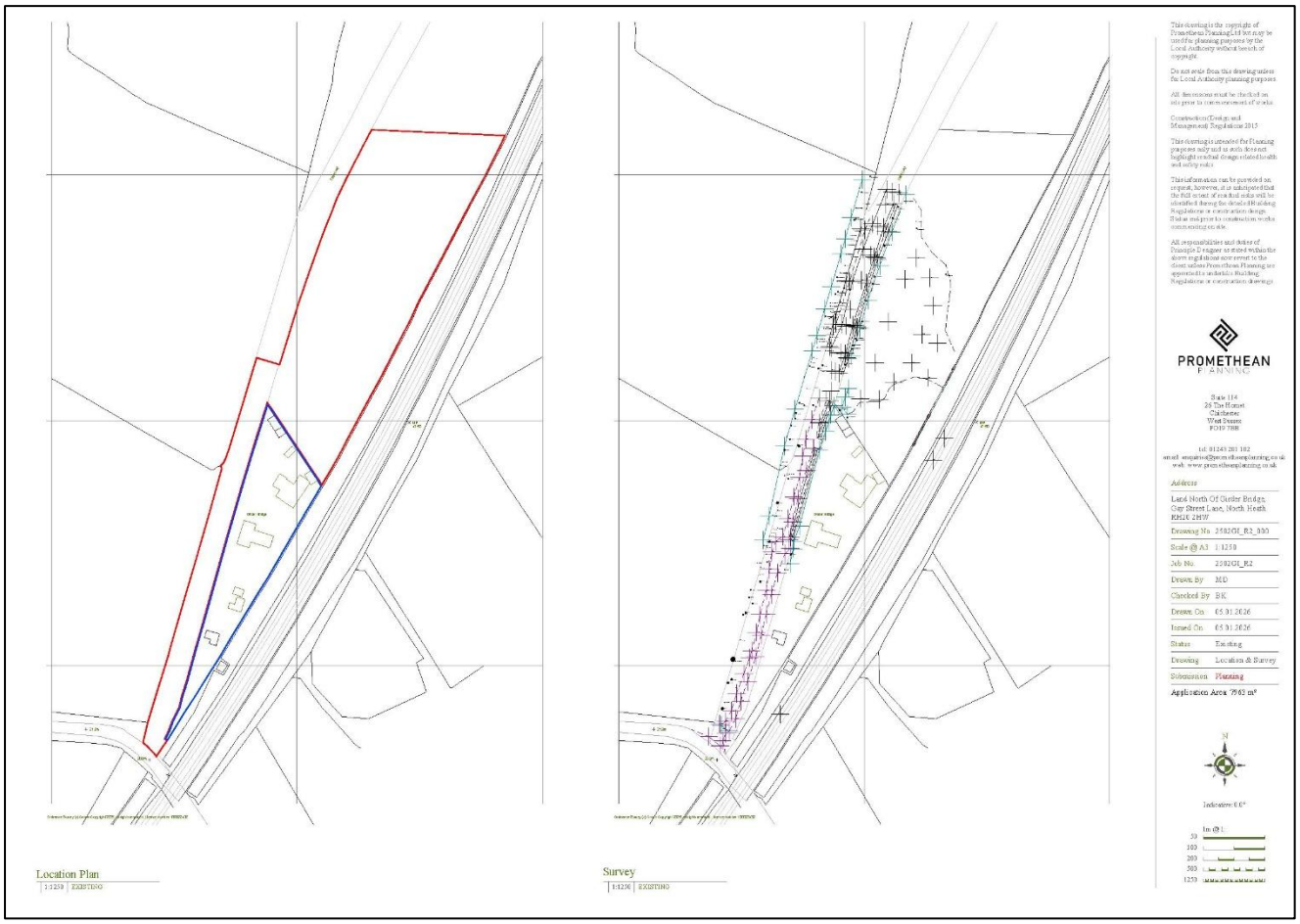

Figure A1: Site Location Plan

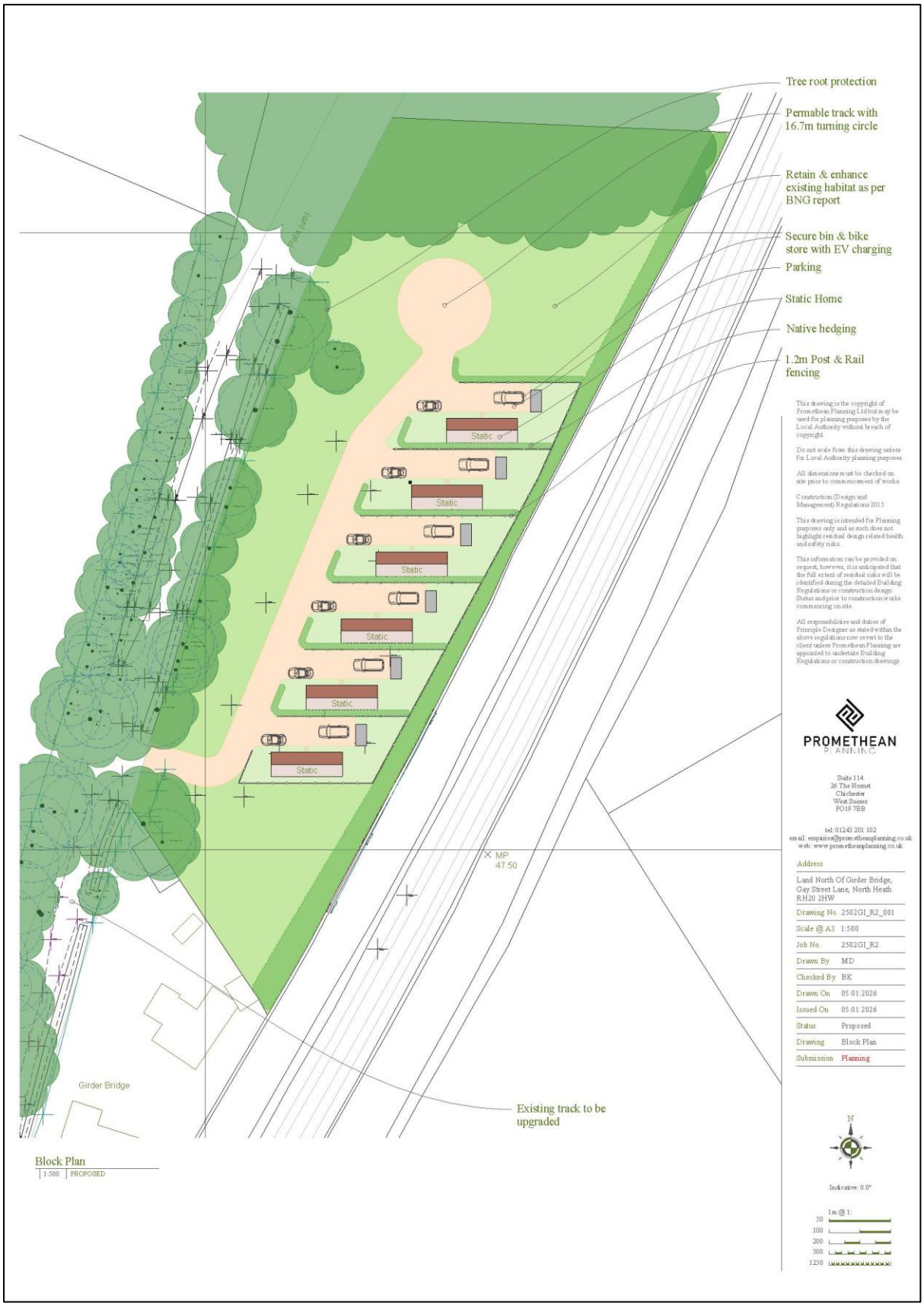

Figure A2: Proposed Site Layout



Figure A3: Site Aerial View and Monitoring Positions

Key

Unattended Monitoring Position

Attended Monitoring Position

Site bounday (Approx.)

Appendix B – Weather Record

Day	Date	Temperature, (°C) Avg (Range)	Wind Speed (ms^{-1}) Avg (Range)	Rel. Humidity	Precipitation Total
Wed	23-Sep-26	15.5 (26.0 / 8.1)	0 (2 / 0)	83 %	0.00 mm
Thu	24-Sep-26	13.5 (22.2 / 7.1)	0.1 (2.9 / 0)	86 %	0.00 mm
Fri	25-Sep-26	14.6 (24.1 / 7.3)	0 (1.4 / 0)	89 %	0.00 mm
Sat	26-Sep-26	14.4 (22.0 / 7.3)	0 (1.9 / 0)	76 %	0.00 mm
Sun	27-Sep-26	14.8 (21.4 / 6.8)	0.4 (4.3 / 0)	89 %	0.00 mm
Mon	28-Sep-26	15.1 (20.5 / 9.2)	0 (1.2 / 0)	85 %	0.00 mm
Tue	29-Sep-26	19.7 (25.8 / 15.3)	0.1 (5.2 / 0)	85 %	0.00 mm

Source: www.wunderground.com

Appendix C – Noise Survey Time History Graph

