



Noise Assessment

Land North of Water Lane
Angmering, West Sussex

February 2018

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1. Introduction

- 1.1 Phlorum Ltd has been commissioned by Gleeson Strategic Land and Rydon Homes Ltd to undertake a noise assessment for the proposed residential-led development on land to the north of Water Lane, Angmering, West Sussex. An Illustrative Masterplan is included as Figure 1.
- 1.2 The proposals comprise the construction of up to 525 housing units, the development of 3ha for employment use and associated highways and landscaping work. Proposals also include improvements to Water Lane's junction with the A280. The total (Red Line) area of the site is approximately 32.1ha.
- 1.3 The application site is located to the east of the existing large village of Angmering. To the north of the site is the A27 and farmland and Water Lane is located to the south of the site. The A280 Angmering Bypass also runs to the south of the site. To the west of the site are light industrial and low density residential areas of Angmering.
- 1.4 The main noise sources in the vicinity of the application site are vehicles travelling on the local road network, specifically the A27 Trunk Road (Arundel Road) to the north of the site and Water Lane, immediately to the south of the site.
- 1.5 The noise assessment considers the effects of traffic generated by the development at nearby sensitive receptors and the effects of noise at the proposed residential dwellings.

2. Policy Context

- 2.1 This section details the legislative and planning context that form the basis for this assessment.

National Planning Policy Framework (NPPF)

- 2.2 The NPPF sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
- 2.3 Under Section 11; Conserving and enhancing the natural environment, the following is stated:

"The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".

- 2.4 The document goes on to state:

"avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development

mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason”.

BS 8233:2014

- 2.5 Guidance on suitable internal noise levels for offices and residential properties is shown in BS8233:2014.
- 2.6 BS 8233 provides guidance for the control of noise in and around buildings, and suggests appropriate criteria and limits for different situations. The Standard states that *“these criteria and limits are primarily intended to guide the design of new or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise level”*. However, it follows that noise criteria and limits that the Standard recommends for new buildings can also be applied to existing dwellings.
- 2.7 Table 4 of BS 8233:2014 is reproduced below and recommends the following noise limits for indoor spaces within dwellings:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-----
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-----
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

- 2.8 BS 8233 also recommends that a maximum noise level or SEL should be considered in bedrooms, where there are regular events.
- 2.9 BS 8233 also provides a design range for spaces that are unoccupied such as offices. Table 2 of BS 8233 is reproduced below and indicates that the design range for open plan offices is $L_{Aeq,T}$ 45 - 50 dB. Table 6 of the standard provides a design range of $L_{Aeq,T}$ 35 – 40 dB for executive offices.

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

World Health Organisation Guidelines

- 2.10 The WHO Guidelines for Community Noise, 1999 provide internal noise levels in the night-time period that indicate the threshold of sleep disturbance. It should be noted that these are not levels that would cause awakenings, but are levels at which any detectable change in sleep patterns, such as pulse rate, start to occur. The WHO guidelines also state that at night, sound pressure levels at the outside facades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax} so that people may sleep with bedroom windows open. These values have been obtained by assuming that the reduction from outside to inside with the windows partly open is 15 dB. This standard provides a precautionary approach and must be used appropriately.
- 2.11 The guidance given by the WHO therefore concurs with a "good" internal noise level as specified by BS 8233 at night and it is recommended, therefore, that internal noise levels within residential accommodation at night should not exceed 30 dB $L_{Aeq,8hr}$. Table 1, of the WHO Guidelines provide a series of recommended noise exposure levels as summarised in Table 2.1 below.

Table 2.1: Guideline values for community noise in specific environments

Specific Environment	Critical Health effect(s)	L_{Aeq} dB	Time Base, Hours	$L_{Amax,fast}$ dB
Outdoor living areas	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling indoors	Speech intelligibility & moderate annoyance	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

ProPG: Planning & Noise

- 2.12 The Professional Practice Guidance on Planning and Noise (ProPG) for New Residential Development was published in May 2017. ProPG has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.
- 2.21 ProPG recommends an initial risk assessment of the site to determine the likely importance of any noise issues. A more detailed second stage includes a systematic assessment of relevant aspects of the development proposal supported by an Acoustic Design Statement. This approach leads to a choice of the following four recommendations to the decision maker:

A. Planning consent may be granted without any need for noise conditions;

B. Planning consent may be granted subject to the inclusion of suitable noise conditions;

C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or

D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

Liaison with Arun District Council

- 2.13 Whilst not yet possible to provide detailed plans to Arun District Council (ADC), the concept of a major residential led development to the east of Angmering was discussed with the Environmental Health Officer (EHO) Graham Evans, on 24th November 2015, with respect to noise.

Local Policy Context

- 2.14 ADC recognises the potential for noise from development within the emerging Local Plan, and states in ‘Policy QE SP1: Quality of the environment’ that:

“the council requires that all development contributes positively to the quality of the environment and will ensure that development does not have a significantly negative impact upon residential amenity, the natural environment or upon leisure and recreational activities enjoyed by residents and visitors to the District.

The location of existing industrial and commercial uses [...] must be taken into consideration when assessing proposals for development sensitive to noise, light, odour and outputs to air.”

Design Manual for Roads and Bridges (DMRB)

- 2.15 The impact of any changes in road traffic noise levels has been considered against the principles and guidance presented within the Design Manual for Roads and Bridges (DMRB) Part 7 HD213/11 Noise and Vibration, 2011. DMRB presents an impact significance matrix for assessing the magnitude of changes in noise level for the short and long term and can be used as criteria for assessing the impact of any changes in road traffic noise levels, as shown below.

Table 2.2: Semantic Descriptors for Traffic Noise in the Short Term

Change in Noise Level L _{A10,18hr} dB	Magnitude of Impact
---	---------------------

0	No Change
0.1 to 0.9	Negligible
1 to 2.9	Minor
3 to 4.9	Moderate
5+	Major

Table 2.3: Semantic Descriptors for Traffic Noise in the Long Term

Change in Noise Level <i>L_{A10,18 hr}</i> dB	Magnitude of Impact
0	No Change
0.1 to 2.9	Negligible
3 to 4.9	Minor
5 to 9.9	Moderate
10+	Major

- 2.16 Table 2.2 is concerned with the short-term difference, which would be considered during the six months following the completion of the construction, thereafter, Table 2.3 applies. The criteria in Table 2.2 above reflect key benchmarks of human response to changes in noise level. For example, a 3 dB change is generally taken to be the smallest change perceptible in the human ear and a 10 dB change is heard as a doubling or halving of the loudness of a source. The 5 dB category has been included as it provides greater definition of the assessment of changes in noise level.
- 2.17 The prediction methodology for traffic noise is the Calculation of Road Traffic Noise (CRTN), 1988. This is an established prediction methodology and enables the change in noise levels to be considered whilst taking the number of Heavy Commercial Vehicles into account.

3. Baseline

- 3.1 This chapter is intended to establish prevailing noise conditions in the vicinity of the application site.

Noise

- 3.2 An assessment of the existing noise climate has been undertaken at two representative locations with 24-hour noise measurements from 13th to 15th January 2016. These measurements provide an indication of the likely noise effects of the existing road network.
- 3.3 The main noise sources are vehicles travelling on the local road network, particularly the A27 to the north of the site and Water Lane to the south.
- 3.4 As the A27 and Water Lane are the busiest roads in the vicinity of the application site, noise measurements were taken adjacent to these roads. The measurement locations are shown on Figure 1 and the baseline noise levels are shown graphically in Figure 2.
- 3.5 At each measurement location the microphone was located 1.5m above the ground and in a free-field location. A summary of the measured 24 hour noise levels is shown in Table 3.1.

Table 3.1: Summary of day and night-time noise levels

Location	Date	Period	Noise Levels, dB(A)			
			L _{eq}	L _{max}	L ₁₀	L ₅₀
1. A27 - 95m from road	13-Jan-16	Day	60.0	68.5	60.8	54.8
	13/14 Jan 16	Night	52.0	63.3	54.4	37.3
2. Water Lane - 80m from road	14-Jan-16	Day	46.9	60.2	48.0	43.7
	14/15 Jan 16	Night	37.4	48.4	39.2	30.9

- 3.6 The weather during the survey consisted a light south-westerly breeze and cold conditions with a daytime temperature of 4°C. The noise levels with the prevailing south-westerly represent 'typical' conditions at the measurement locations.

- 3.7 The noise equipment comprised of a Larson Davis 824 Sound Analyser and a Larson Davis 820 sound level meter. The calibration of the instrumentation was checked using a Larson Davis CAL200 acoustic calibrator both before and after the survey and no significant drift was noted. All equipment is within current manufacturer's periods of calibration.
- 3.8 The instrument was set to record noise levels automatically over 15-minute periods. The time-weighting was set to "fast" and the frequency weighting was set to "A".

4. Assessment

Methodology

Baseline Noise Assessment

- 4.1 The measurements at site 1 were taken 95m south of the A27 to provide the representative noise close to the northern site boundary. At site 2 a noise level of $L_{Aeq,16hr}$ 47 dB was measured 80m to the North of Water Lane.

Impacts on Existing Receptors

- 4.2 The generation of traffic by the development heading west on Water Lane into Angmering village is considered to have the greatest potential to cause significant impacts at existing residential properties.
- 4.3 The traffic flows from local committed developments have been included in the opening year scenario (2021) within the noise assessment model, in order to assess potential cumulative effects.

Traffic Noise

- 4.4 A noise assessment based on the traffic flow data for the year of opening, 2021 of the scheme has been undertaken to enable the noise to be considered against the Design Manual of Roads and Bridges (DMRB).
- 4.5 In order to determine the effects of noise from the operation of the proposed development, the impact from local roads have been assessed using IMMI noise modelling software. The model has been validated and approved on numerous road traffic schemes on UK roads.
- 4.6 The model considers the road traffic flows in the day (0600-0000 hrs) and night-time (0000-0600 hrs), traffic speeds and % HGV's for both the 'with' and 'without' scheme scenarios for the proposed year of opening of the Development. The model takes the site topography, distance attenuation, ground effects, receptor heights and sound attenuation provided by existing landforms and structures.

Consultation

- 4.7 The proposed development was discussed with ADC's Principal Environmental Health Officer (EHO) for noise in November 2015. He confirmed his acceptance of the scope of assessment detailed above.

5. Operational Impacts

Noise Contours

- 5.1 The predicted noise contours at ground floor level for the day and night-time periods with the Development in the year of opening, 2021 are shown in Figures 3 and 4. The noise contours show the effects of road traffic on the Development site.

Development Receptor Noise Levels

- 5.2 The predicted noise levels at selected receptor locations are shown in Table 5.1. The noise contours have been converted to facade noise levels to enable the assessment of appropriate noise mitigation measures. The receptor locations are shown on Figure 5.

Table 5.1: Predicted Facade Noise Levels

Receptor	Noise Levels, $L_{Aeq,T}$ dB			
	Ground Floor		First Floor	
	Day	Night	Day	Night
1	52.8	37.5	54.7	39.5
2	63.0	47.7	64.1	48.8
3	62.4	47.2	64.2	48.9
4	60.7	45.5	62.3	47.0
5	66.2	51.0	68.2	52.9
6	60.0	44.7	66.0	50.7
7	64.5	49.2	68.9	53.6
8	51.6	36.5	55.7	40.5
9	47.2	32.6	49.5	34.9
10	57.0	43.9	57.5	44.4
11	57.1	44.3	57.7	44.9
12	54.4	39.2	55.0	39.8
13	55.6	41.4	56.9	42.7
14	66.0	51.8	66.5	52.3
15	67.3	53.1	67.9	53.7
16	71.0	56.8	70.9	56.7
17	62.2	48.3	62.6	48.7

- 5.3 The internal target noise levels that have been adopted for the residential development are those outlined in BS8233:2014; at night, L_{AeqT} 30 dB and L_{AeqT} 35 dB during the daytime. The internal maximum night-time noise level target from the WHO guidelines in $L_{Amax,f}$ 45 dB. To meet the BS8233:2014 internal target noise levels the assessment considers appropriate sound insulation measures on the elevations of the building based on the baseline noise measurements. These noise mitigation measures are discussed below.
- 5.4 The guideline values in BS8233:2014 are consistent with the target noise levels provided in the ProPG guidance.
- 5.5 The mitigation strategy is formulated on the following basis:
- Ensure that internal noise levels comply with WHO/BS8233 criteria;
- 5.6 For internal noise, it has been assumed that the minimum amelioration measure available to an occupant will be to close bedroom windows. Therefore, in order to assess the acoustic performance of the proposed dwellings, it is appropriate in the first instance to explore the level of protection that will be afforded by the performance of the glazing elements.
- 5.7 To meet the daytime target noise levels in the year 2021 with the committed development plus development traffic flows at Receptor 7, which overlooks the A27 and has the highest facade noise levels on the north of the Development site, the glazing would need to provide $R_w + C_{tr}$ 34 dB and at night the glazing would need to provide $R_w + C_{tr}$ 24 dB. To meet the daytime noise target would require acoustic glazing such as 6mm / 16 mm argon / 8.8mm Pilkington Optiphon construction (or similar) which provides $R_w + C_{tr}$ 34 dB and R_w 41 dB. These figures take the façade reflection effects into account.
- 5.8 To meet the daytime target noise levels in the year 2021 with the committed development plus development traffic flows at Receptor 16, which overlooks Water Lane and has the highest facade noise levels on the south of the Development site, the glazing would need to provide $R_w + C_{tr}$ 36 dB and at night the glazing would need to provide $R_w + C_{tr}$ 27 dB. To meet the daytime noise target would require specialist acoustic glazing such as 8mm / 16 mm argon / 9.1mm Pilkington Optiphon construction (or similar) which provides $R_w + C_{tr}$ 36 dB and R_w 43 dB. These figures take the façade reflection effects into account.
- 5.9 For residential elevations that do not face towards the A27 or Water Lane a lower glazing specification will be appropriate, than that detailed above. When the final layout plans are available the glazing specifications for individual dwellings can be determined across the site.

Maximum Noise Levels

- 5.10 The external noise measurements indicate that at Site 1 the typical maximum noise level at night was $L_{Amax,f}$ 63 dB at a distance of 95m from the nearside carriageway of the A27 and no maximum noise events at night exceeded a maximum noise levels of $L_{Amax,f}$ 70 dB. The nearest proposed residential is 104m from the A27 and at a similar distance from the A27 as the noise measurements.
- 5.11 For residential properties that overlook the A27 the proposed glazing would provide R_w 41 dB and a free-field maximum noise level of $L_{Amax,f}$ 83 dB would exceed the internal maximum target noise level. The noise levels at the nearest proposed receptors to the A27 indicate that there were no events where the maximum noise level would exceed $L_{Amax,f}$ 83 dB in the night-time period.
- 5.12 For residential properties that overlook Water Lane the proposed glazing would provide R_w 43 dB and a free-field maximum noise level of $L_{Amax,f}$ 85 dB would exceed the internal maximum target noise level. The maximum night-time noise levels at a distance of 80m from Water Lane did not exceed a level of $L_{Amax,f}$ 55 dB. The nearest proposed receptors to Water Lane are located 5m from the road and the extrapolated level at 5m from the road is $L_{Amax,f}$ 79 dB. The measured noise levels adjacent to Water Lane indicate that there were no events where the maximum noise level would exceed $L_{Amax,f}$ 85 dB in the night-time period.
- 5.13 Section 3.4 of the WHO Guidelines states that for good sleep, indoor noise levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times/night. With the proposed glazing the indoor noise level would not be exceeded based on the corrected measured noise levels. The WHO Guidance considers this to be within an acceptable number of maximum noise events per night.
- 5.14 To enable the option for windows to be closed to meet the noise targets, acoustically treated ventilation should be provided to habitable rooms that overlook the A27 and Water Lane. The windows should be openable such that the choice of meeting the internal noise levels is with the occupants

Outdoor Living Areas

- 5.15 The WHO guidance provides daytime noise limits for outdoor living areas of between $L_{Aeq,16\text{ hr}}$ 50 to 55 dB. The predicted noise levels indicate that at ground floor the proposed residential properties overlooking the A27 will experience free-field noise levels of between 50 to 64 dB $L_{Aeq,16\text{ hr}}$ during the day. At proposed residential properties overlooking Water Lane the predicted free-filed noise level are between 60 to 69 dB $L_{Aeq,16\text{ hr}}$ during the day.

- 5.16 BS8233:2014 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.
- 5.17 However, in considering the application of an outdoor criterion of 50-55 dB L_{Aeq} , which is derived from the earlier World Health Organisation (WHO) guidance, it is important to take account of the feasibility of achieving such a level. A review of 'Health effect-based noise assessment methods: A review and feasibility study' (NPL Report CMAM 16, 1998) reported the following:

"Perhaps the main weaknesses of both WHO-inspired documents is that they fail to consider the practicality of actually being able to achieve any of the stated guideline values. We know from the most recent national survey of noise exposure carried out in England and Wales (Sargent 93) that around 56% of the population are exposed to daytime noise levels exceeding 55 L_{Aeq} and that around 65% are exposed to night-time noise levels exceeding 45 L_{Aeq} (as measured outside the house in each case). The percentages exposed above the WHO guideline values could not be significantly reduced without drastic action to virtually eliminate road traffic noise and other forms of transportation noise (including public transport) from the vicinity of houses. The social and economic consequences of such action would be likely to be far greater than any environmental advantages of reducing the proportion of the population annoyed by noise. In addition, there is no evidence that anything other than a small minority of the population exposed at such noise levels find them to be particularly onerous in the context of their daily lives."

- 5.18 The predicted noise levels at the nearest residential amenity areas to the A27 will exceed the free-field outdoor criterion of 50-55 dB L_{Aeq} . To reduce the noise effects to within the guidance provided by BS8233:2014 and the WHO guidance a noise reduction of at least 9 dB(A) is required. Acoustic barriers located on the northern perimeter of residential gardens with a height of 2m would reduce the noise levels in outdoor living areas to within the guideline values of 50-55 dB L_{Aeq} .

- 5.19 The predicted noise levels at the nearest residential amenity areas to Water Lane will exceed the outdoor criterion of 50-55 dB L_{Aeq} . To reduce the noise effects to within the guidance provided by BS8233:2014 and the WHO guidance a noise reduction of between 5 to 14dB(A) is required. Acoustic barriers located on the southern perimeter of residential gardens overlooking Water Lane with a height of 3m would reduce the noise levels in outdoor living areas to within the guideline values of 50-55 dB L_{Aeq} .

Traffic Noise Effects at Existing Residential

- 5.20 The change in noise level due to Development traffic in the year of opening (2021) has been considered on the roads surrounding the site. The assessment has considered the scenarios of 'without development' against the 'with development' in both the day and night-time periods to enable the change in noise to be assessed against the guidance in DMRB.
- 5.21 The traffic flows and predicted changes in noise level are shown in Appendix B. In both the day and night-time periods the change in noise level in the year of opening is between 0 to 1 dB(A). DMRB considers this to be a negligible change in noise in both the short and long term.

6. Conclusions

- *****
- 6.1 Phlorum Ltd has been commissioned by Gleeson Strategic Land and Rydon Homes Ltd to undertake a noise assessment for the proposed residential-led development on land to the north of Water Lane, Angmering, West Sussex.
 - 6.2 To meet the internal noise targets sound insulation measures including acoustic glazing and acoustically treated ventilation will be provided to habitable rooms that face towards the A27 and Water Lane.
 - 6.3 A scheme of noise barriers is required on the perimeter of the gardens that face towards the A27 and Water Lane to reduce the outdoor noise to within the guideline values provided in BS8233:2014.
 - 6.4 The change in noise level due to Development traffic in the year of opening (2021) has been considered on the roads surrounding the site. In both the day and night-time periods the change in noise level in the year of opening is between 0 to 1 dB(A). DMRB considers this to be a negligible change in noise in both the short and long term.
 - 6.5 Considering the above, and incorporating appropriate noise mitigation measures the proposed development has been determined to be acceptable in terms of its impact on, and sensitivity to, local noise.
 - 6.6 The proposed development is expected to comply with all relevant noise policy. Noise should not, therefore, pose any significant obstacles to the planning process.

Figures and Appendices

Figure 1: Noise Prediction Locations & Site Layout



★ Sites 1 & 2 - Noise Measurement Locations

Figure 2: Baseline Noise Measurements

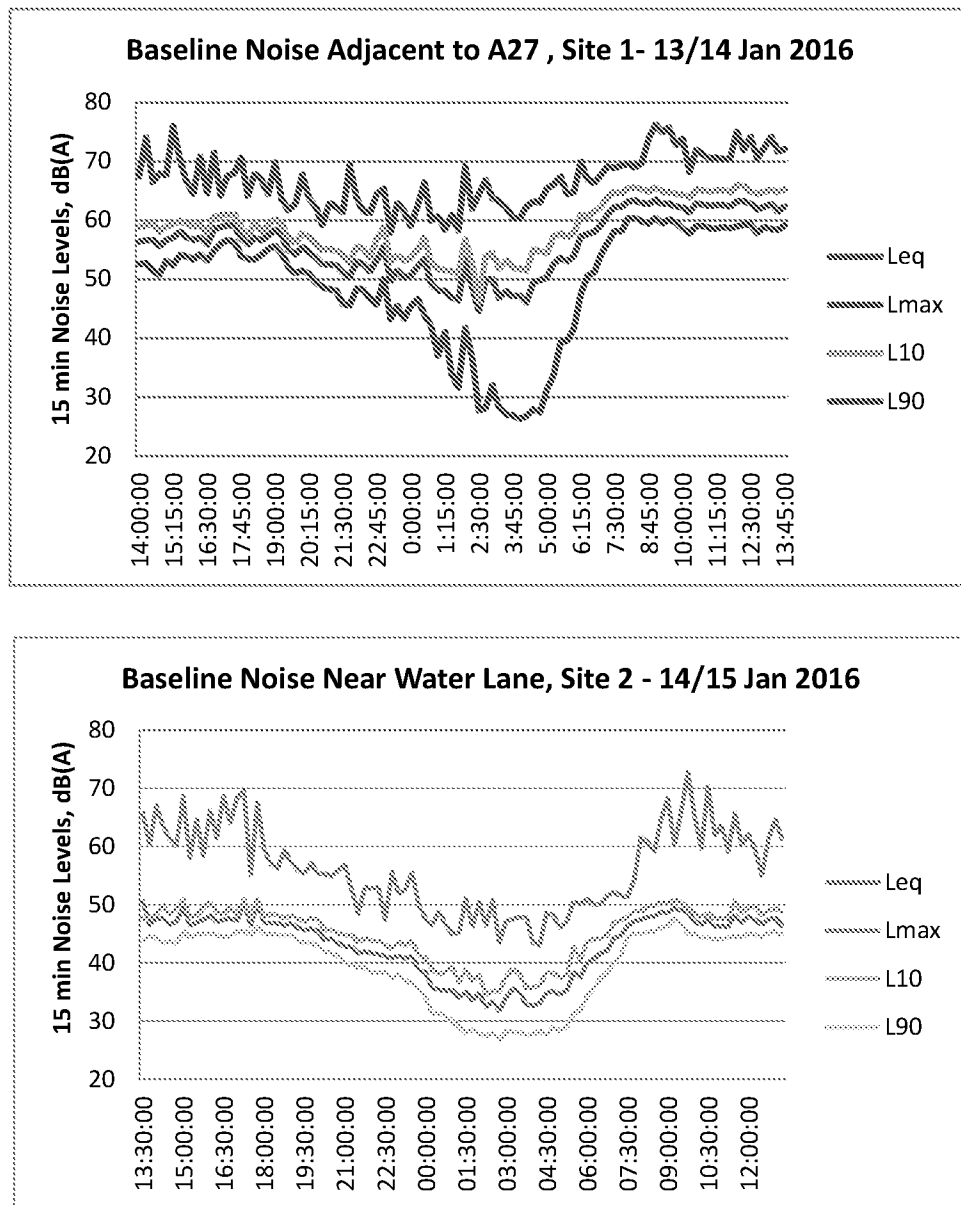


Figure 3: Ground Floor Noise Contours, Daytime 2019

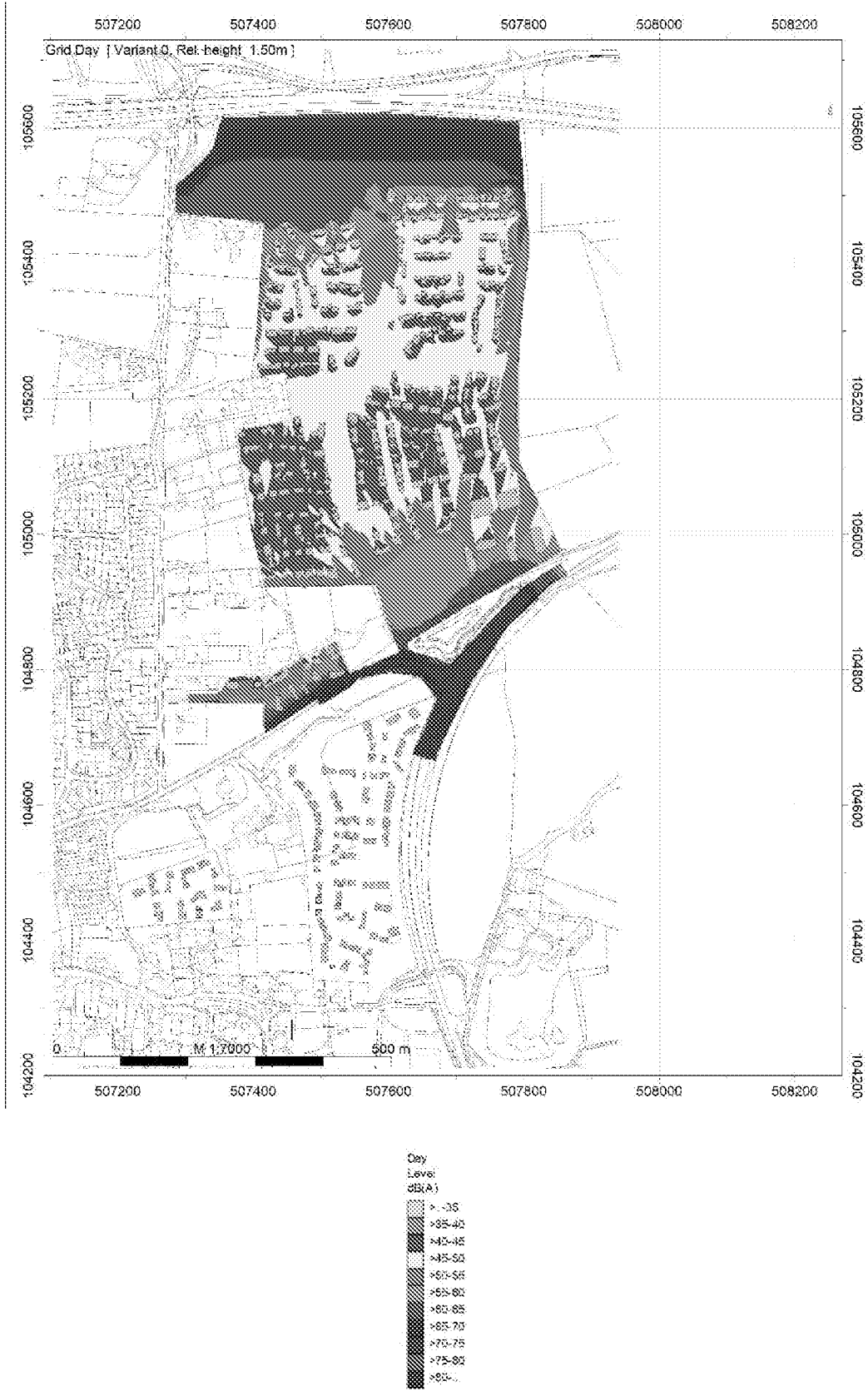


Figure 4: Ground Floor Noise Contours, Night-time 2019

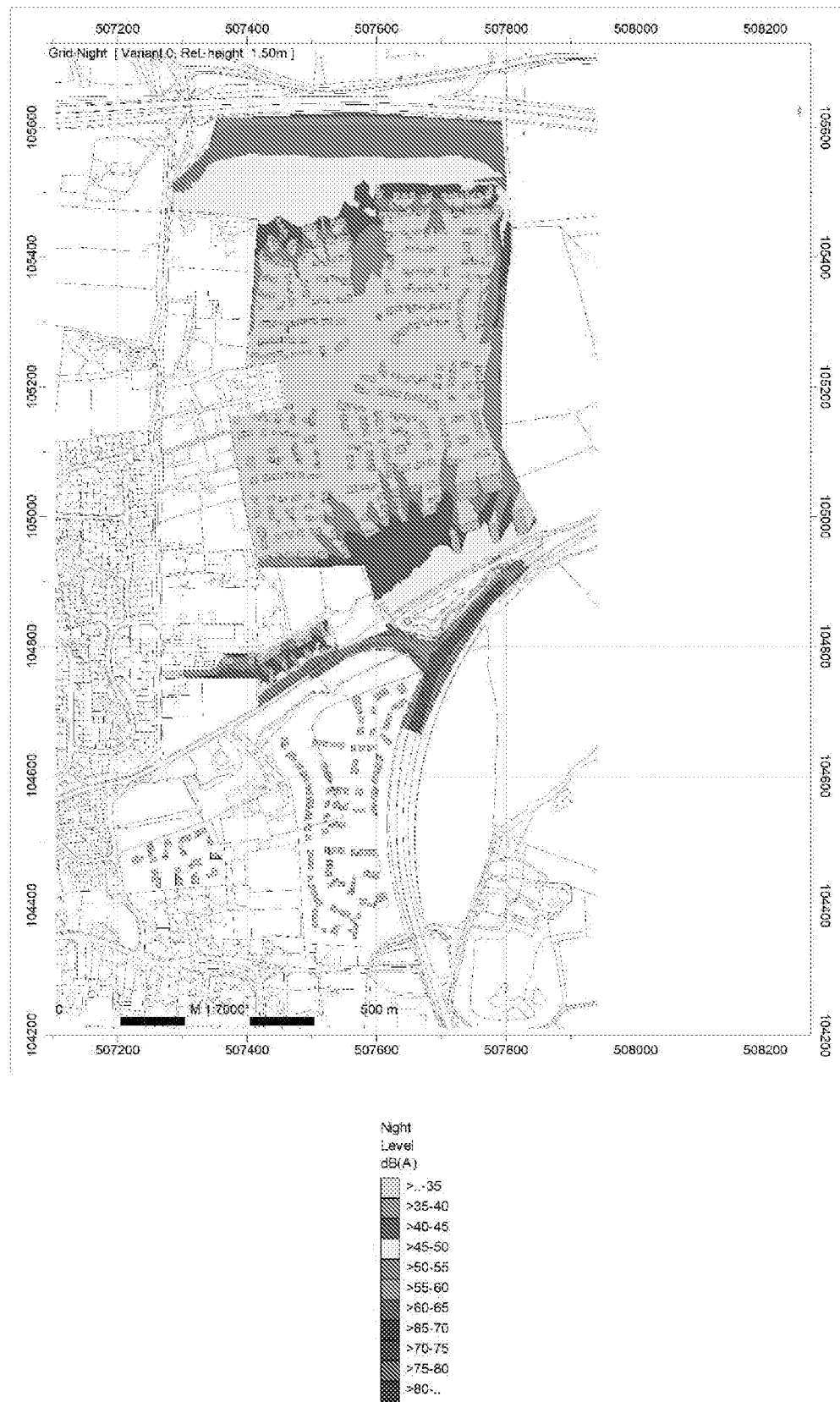


Figure 5: Noise Receptor Locations



Appendix A: Glossary of Acoustic Terms

- A1.1 Noise is defined as unwanted sound. The range of audible sound is from 0dB to 140dB. The frequency response of the ear is usually taken to be about 18Hz to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used and which correlates best with the subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.
- A1.2 The ear can just distinguish a difference in loudness between two noise sources when there is a 3dB(A) difference between them. Also when two sound sources of the same noise level are combined the resultant level is 3dB(A) higher than the single source. When two sounds differ by 10dB(A) one is said to be twice as loud as the other.
- A1.3 A few examples of noise of various levels are shown in the Table below:

Sound Level dB(A)	Environmental Condition
0 to 10	Threshold of hearing
10 to 20	Broadcasting Studio
20 to 30	Bedroom at night
30 to 40	Library
40 to 50	Living room in urban area
50 to 60	Typical business office
60 to 70	Conversational speech
70 to 80	Traffic noise on street corner
80 to 90	Inside a moving bus
90 to 110	1m from an alarm clock
110 to 120	1m from loud car horn
120 to 130	1m from pneumatic drill
130 to 140	Threshold of pain

A1.4 The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations. The indices and parameters used in this report are defined below:

- Equivalent Continuous Sound Pressure Level (L_{Aeq}): The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation.
- L_N : the A-weighted sound level exceeded for N% of the measurement period.
- L_{AMAX} : The maximum 'A' weighted noise level recorded during the measurement period.

Appendix B: Traffic Data

Traffic Flows and Noise Level Difference in 2021

Daytime (0600-0000 hrs)								
Link ID	Link Name	2021 With Committed Dev			2021 With Committed Dev + Dev			Change in Noise
		Eastbound	Westbound	18hr AAWT	Eastbound	Westbound	18hr AAWT	dB
1	Water Lane (west of A280)	5057	5261	10318	6792	6255	13047	1.0
2	A280 Angmering Bypass	9916	11235	21151	10955	12228	23183	0.4
3	A280 (North of Ecclesden Lane)	6199	7492	13691	6251	6738	12989	-0.2
4	Water Lane (east of Dappers Lane)	5057	5261	10318	5806	5354	11160	0.3
5	Water Lane (east of High Street)	3803	3593	7396	4406	3701	8107	0.4
6	High Street (west of Cotterels)	911	1368	2279	911	1368	2279	0.0
7	Station Road	6285	4254	10539	6882	4356	11238	0.3
8	Arundel Road	3231	2561	5792	3237	2567	5804	0.0
9	A27 (west of Long Furlong)	14400	15357	29757	14574	15539	30113	0.1
Night-time (0000-0600 hrs)								
Link ID	Link Name	2021 With Committed Dev			2021 With Committed Dev + Dev			Change in Noise
		Eastbound	Westbound	18hr AAWT	Eastbound	Westbound	18hr AAWT	dB
1	Water Lane (west of A280)	293	64	357	312	74	386	0.3
2	A280 Angmering Bypass	489	182	671	499	192	691	0.1
3	A280 (North of Ecclesden Lane)	304	148	452	305	135	440	-0.1
4	Water Lane (east of Dappers Lane)	293	64	357	301	63	364	0.1
5	Water Lane (east of High Street)	162	50	212	168	49	217	0.1
6	High Street (west of Cotterels)	0	13	13	0	13	13	0.0
7	Station Road	185	66	251	191	65	256	0.1
8	Arundel Road	40	34	74	40	34	74	0.0
9	A27 (west of Long Furlong)	413	478	891	415	480	895	0.0

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