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WASTE RESOURCE MANAGEMENT

HOLLINGTON STONE QUARRIES LTD

TEARNE QUARRY

NOISE ASSESSMENT REPORT

NOVEMBER 2017

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JOB NUMBER: **LE14096**

REPORT NUMBER: **002**

HOLLINGTON STONE QUARRIES

TEARNE QUARRY

NOISE ASSESSMENT REPORT

NOVEMBER 2017

PREPARED BY:

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Wardell Armstrong is the trading name of Wardell Armstrong LLP, Registered in England No. OC307138.

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DRAWINGS

1 INTRODUCTION

1.1.1 By instruction dated 10th August 2017 from Mr. Richard Oldham of Hollington Stone Quarries Ltd, Wardell Armstrong LLP was commissioned to undertake a noise assessment to support a full planning application for the development of 9 residential dwellings at Tearne Quarry, off Main Road, Hollington, Staffordshire.

1.1.2 The site is located to the north west of Uttoxeter in Hollington and currently comprises a car park, offices and storage sheds associated with Tearne Quarry. To the north, the site is bordered by Main Road, with agricultural land beyond. To the east, the site is bordered by further agricultural land used for grazing livestock beyond which are residential properties and a public house. To the south, the site is bordered by Tearne Quarry with a densely wooded area, further agricultural land and associated farmsteads beyond. To the west, the site is bordered by a combination of residential properties, densely wooded areas and, approximately 200m away, a stone masonry processing facility.

1.1.3 The proposed development is residential in nature and will comprise approximately 9 dwellings together with associated infrastructure. The location of the site is shown on drawing number LE14096- 001. As part of the application a layout has been provided (Ref A2561-002), and has been used to inform this noise assessment report.

1.1.4 This noise report has been prepared in support of a full planning application. It assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations for noise mitigation as appropriate.

2 ASSESSMENT METHODOLODGY

2.1 Consultation and Scope of Works

2.1.1 The potential impacts of the proposed development and general principles of the assessment methodology were sent to Mr. Dennis Colgan, Pollution Officer at Staffordshire Moorlands District Council. Mr Colgan replied via email on 10th November 2017, stating that the noise assessment would need to take 'account of the existing noise conditions on the quarry operations, and ensures these operations are not compromised by any proposed residential development'.

2.1.2 The decision notice for the quarry was granted in May 2016, with conditions attached. The decision notice (Ref SM.14/05/117 M) for the quarry contains Condition 25, relating to noise, which is set out below;

'25. No operations from the Site shall take place which would result in site attributable noise levels exceeding 49 dB $L_{Aeq\ (1\ hour)}$ at The Old Post Office'.

2.1.3 Mr. Colgan also stated that the noise assessment should make reference to the Professional Practice Guidance on Planning and Noise (ProPG), which predominantly relates to road traffic noise on proposed residential developments.

2.1.4 The scope of the noise assessment includes consideration of noise at sensitive areas of the proposed development, i.e. proposed residential areas, specifically in terms of the potential impact of existing transportation noise and any other noise sources, and is in line with current guidance.

2.2 Noise Surveys

2.2.1 As part of this assessment, Wardell Armstrong LLP has carried out attended noise surveys to assess the current noise levels at proposed receptor locations.

2.2.2 The potential sources of noise are road traffic on Main Road and to a lesser extent the remainder of the local road network. In addition, noise from the operations at Tearne Quarry, located to the south of the site, will also need to be considered. The noise survey is discussed in greater detail in Chapter 3 of this report.

2.3 Assessment Methodology

2.3.1 The noise assessment takes into account current guidance including the following:

- National Planning Policy Framework, 2012;
- Noise Policy Statement for England, 2010;

- Planning Practice Guidance - Noise, 2014 (PPG);
- Pro:PG Planning & Noise: Professional Practice Guidance on Planning and Noise (2017);
- Planning Practice Guidance (Assessing environmental impacts from minerals extraction), 2014;
- The World Health Organisation Guidelines for Community Noise 1999 (WHO); and,
- British Standard 8233: 2014 Guidance on Sound Insulation and noise reduction for buildings (BS8233).

National Planning Policy Framework

2.3.2 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. Paragraph 123 of the NPPF states:

'Planning policies and decisions should aim to:

- 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.'

2.3.3 With regard to 'adverse impacts' the NPPF refers to the 'Noise Policy Statement for England' (NPSE), which defines three categories, as follows:

'NOEL – No Observed Effect Level

- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

- This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

- This is the level above which significant adverse effects on health and quality of life occur'.

2.3.4 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

2.3.5 The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table 1 summarises the noise exposure hierarchy.

Table 1 National Planning Practice Guidance noise exposure hierarchy			
Perception	**Examples of Outcomes**	**Increasing Effect Level**	**Action**
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.3.6 The Noise Policy Statement for England refers to the World Health Organisation (WHO) when discussing noise impacts. The WHO Guidelines for Community Noise 1999 suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general populations. Guideline values for annoyance which relate to external noise exposure are set at 50 or 55 dB(A), representing day time levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed respectively. The following guideline values are suggested by WHO:

- 35 dB $L_{Aeq\ (16\ hour)}$ during the day time in noise sensitive rooms
- 30 dB $L_{Aeq\ (8\ hour)}$ during the night time in bedrooms
- 45 dB $L_{Af,Max}$ during the night time in bedrooms
- 50 dB $L_{Aeq\ (16\ hour)}$ to protect majority of population from becoming moderately annoyed
- 55 dB$L_{Aeq\ (16\ hour)}$ to protect majority of population from becoming seriously annoyed

2.3.7 British Standard 8233 "Guidance on sound insulation and noise reduction for buildings" 2014 bases its advice on the WHO Guidelines. In addition, for internal noise levels it states;

"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."

2.3.8 Furthermore, with regard to external noise, the Standard states;

"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 guidance value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised 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".

2.3.9 The PPG summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

"Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other environmental dimensions

of proposed development".

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise

2.3.10 ProPG Planning and Noise provides professional practice guidance in relation to new residential development exposed to noise from transport sources. It provides practitioners with a recommended approach to the management of noise within the planning system in England.

2.3.11 The guidance reflects the Government's overarching National Planning Policy Framework, the Noise Policy Statement for England, and Planning Practice Guidance (including PPG-Noise) and draws on other authoritative sources of guidance. It provides advice for Local Planning Authorities and developers, and their professional advisors, on achieving good acoustic design in and around new residential developments.

Planning Practice Guidance (Assessing environmental impacts from minerals extraction), 2014

Noise standards for normal operations

2.3.12 The Planning Practice Guidance suggests that mineral planning authorities should aim to establish a noise limit at the noise sensitive property. The noise level limit should be set so as to not exceed the background noise level ($L_{A90,(1\ hour)}$) by more than 10dB between 0700 and 1900 hours.

2.3.13 This limit applies until the total noise from the operations reaches 55dB L_{Aeq} (1 Hour) free field, at the existing sensitive receptor.

3 NOISE SURVEY

3.1.1 On the 28th September 2017, Wardell Armstrong LLP carried out a noise survey at the proposed development site.

3.1.2 Attended noise measurements were taken at 1 Monitoring Location (ML). The ML is as follows, and is shown on Drawing Number LE14096-001:

- ML1: In the north western part of the site, approximately 15m from Main Road. This location is considered to be representative of noise levels in the northern part of the site.

3.1.3 Attended noise monitoring was carried out between 0942 hours and 1042 hours, on 28th September 2017.

3.1.4 On the 28th September the weather conditions during the survey were as follows:

- Light breeze up to 1m/s;
- Damp ground;
- Temperature approximately +15˚C; and
- Cloud cover approximately 40%.

3.2 Additional Survey

3.2.1 On the 6th October 2017, Wardell Armstrong LLP carried out an additional noise survey to measure noise from operations at the quarry in the southern part of the proposed development site.

3.2.2 Attended noise measurements were taken at 1 further Monitoring Location (ML). The ML is as follows, and is shown on Drawing Number LE14096-001:

- ML2: In the middle of the proposed development site near to the existing office buildings.

3.2.3 Attended noise monitoring was carried out between 0914 hours and 1245 hours on the 6th October 2017.

3.2.4 On the 6th October the weather conditions during the survey were as follows:

- Low wind up to 3m/s;
- Dry ground;
- Temperature approximately +10˚C at the start of the survey, rising to +13 ˚C; and,
- Approximately 30% cloud cover.

Summary

3.2.5 The noise measurements were made using two Class 1, integrating sound level meters. The sound level meters were mounted vertically on tripods 1.2m above the ground. The sound level meters were calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey.

3.2.6 A-weighted[1] L_{eq}[2] noise levels were measured to comply with the requirements of WHO, BS8233 and PPG. A-weighted L_{90}[3] and L_{10}[4] noise levels, together with the maximum and minimum sound pressure levels, were also measured to provide additional information. The measured noise levels are set out in full in Appendix A.

3.2.7 Attended noise monitoring allows observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels. The observations identified the following:

Tearne Quarry: Noise from Tearne Quarry was dominant at the site. The noise sources included heavy plant machinery, including bangs and scrapes, drilling, a compressor and radio.

Road Traffic Noise: Noise from occasional road traffic was audible, but not dominant, at both locations during the surveys.

Birdsong: Birdsong and noise from livestock was frequently audible at both locations during the daytime periods. Noise from low level aircraft was occasionally audible at both locations.

[1] A' Weighting — An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

[2] L_{eq} — Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

[3] L_{90} — The noise level which is exceeded for 90% of the measurement period.

[4] L_{10} — The noise level which is exceeded for 10% of the measurement period.

4 NOISE IMPACT ASSESSMENT

4.1 Site Observations

4.1.1 It is understood that Main Road is used as the primary commuting route by employees to access the JCB World Headquarters, during the morning (0745-0800hrs) and afternoon (1715-1730 hrs) periods. This road traffic produces a significant amount of noise at these times, although traffic during the remaining daytime (0700-2300hrs) is comparatively low. Noise from road traffic during the daytime is assessed over a 16-hour period (0700-2300 hours), and compared against a specific guideline noise level. Therefore, the average noise level over the whole daytime period will remain at a relatively low level, despite the short, busy periods during the morning and afternoon.

4.1.2 The site layout, provided by the client, shows that proposed dwellings will be set back approximately 20m from the road, with outdoor living areas located on the screened side of dwellings. It is therefore considered that noise from Main Road is unlikely to be significant, and has not been assessed further.

4.1.3 The dominant source of noise affecting the proposed development site is operations at Tearne Quarry. As the quarry only operates during the daytime period, night-time noise at the development site has not been considered further.

4.2 Existing Noise Levels

4.2.1 The results for each of the monitoring locations are presented in Table 2.

Table 2: Measured Daytime Noise Levels (Figures in dB L_{Aeq})

Time	Monitoring Location	Measured Noise Level
0700-2300	1	49
0700-2300	2	57

4.3 Assessment of Daytime Noise Levels in Outdoor Living Areas

4.3.1 Observations made during the noise survey, confirmed that the operational activities associated with the quarry were audible at ML1 and ML2 throughout the survey.

4.3.2 The operations associated with the quarry were taking place at a ground height which is lower than that of the development site.

4.3.3 The proposed residential dwellings will be located closer to the quarry than the existing residential receptors. No noise limit set by a planning condition is in force for

these receptors, therefore it is considered that the noise levels recommended in the Planning Practice Guidance 'Assessing Environmental Impacts from Minerals Extraction' should be adopted.

4.3.4 A specific noise level of 58dB L_{Aeq} was measured at ML2, when the quarry was operational. The measured noise level was clearly dominated by noise from the quarry, therefore no adjustments have been made to allow for noise from other sources. Noise from the quarry included the following sources;

- The operation of plant machinery;
- Intermittent scrapes and bangs;
- A compressor; and,
- A drill.

4.3.5 The noise monitoring also included a scheduled break at the quarry, where works ceased for approximately 25 minutes. This period has been used to provide a representative background noise level at the proposed development site, in the absence of noise from the quarry.

4.3.6 For the purpose of this assessment, the background noise level of 34dB L_{A90} measured at ML2 (over the period 1020-1046) on 6th October 2017 is considered to be typical of the background noise level in the vicinity of Tearne Quarry.

4.3.7 The Planning Practice Guidance used to assess noise from mineral operations at nearby sensitive properties, states that where possible noise from normal working should not exceed the background noise level by more than 10dB(A), up to a maximum of 55dB L_{Aeq}.

4.3.8 The proposed site layout shows that outdoor living areas are located between the dwellings and Tearne Quarry. At 58dB L_{Aeq}, noise from the quarry will exceed the measured background noise level in garden areas by approximately 24dB. This is more than 10dB above the background noise level.

4.3.9 The noise from the quarry would also be above 55dB L_{Aeq} in garden areas, which is the upper limit suggested by the Planning Practice Guidance.

4.3.10 Therefore, mitigation is required to reduce noise from Tearne Quarry at proposed sensitive receptors.

4.4 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

4.4.1 The daytime noise levels in noise sensitive rooms of the proposed dwellings have been assessed in accordance with WHO and BS8233 guideline noise levels for living room and bedroom areas. The guideline daytime noise level within living rooms and bedrooms is 35 dB $L_{Aeq\ (16hr)}$.

4.4.2 The measured daytime noise levels have been used to determine the noise levels likely at the facades of the properties in the vicinity of the proposed noise sensitive parts of the development, during the daytime period.

4.4.3 Before internal noise levels can be calculated 3dB(A) must be added to the free-field measured levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.

4.4.4 The calculated noise levels at the façades of the proposed dwellings, together with the level of attenuation required to achieve 35dB $L_{Aeq\ (16hr)}$ in living rooms and bedrooms is summarised in Table 3.

Table 3: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Daytime Guidance Noise Level (Figures in dB(A))

Properties	Noise Level at the Façade of the Property dB(L_{Aeq})	Level of Attenuation Needed to Achieve Guidance Noise Levels in Living Rooms and Bedrooms dB(A)
Northern facades of proposed dwellings, closest to Main Road i.e. Monitoring location 1	52	17
Southern Facades of proposed dwellings, closest to Tearne Quarry i.e. Monitoring location 2	60	25

5 NOISE ATTENUATION SCHEME

5.1 Introduction

5.1.1 The results of the noise assessment, for the proposed residential areas of the development, indicate that noise mitigation would need to be incorporated into the development proposals to ensure that the noise guidance levels are achieved in all outdoor living areas, living rooms and bedrooms during the daytime.

5.2 Assessment of Predicted Noise Levels in Outdoor Living Areas

5.2.1 Prediction calculations have been undertaken to determine noise levels in proposed outdoor living areas, due to operations at Tearne Quarry and with reference to the proposed site plan, drawing A2561-002, prepared by A.J.S Structural Design. To ensure that the background noise level is not exceeded by more than 10dB in outdoor living areas, a 4.0m high barrier or barrier/bund combination will be required between outdoor living areas and Tearne Quarry.

5.3 Assessment of Noise Levels in Living Room and Bedroom Areas

5.3.1 The noise levels likely at the facades of the properties in the vicinity of the monitoring locations have been determined during the daytime periods due to noise from the quarry, and occasional road traffic noise on Main Road. The calculations assume there is a 4.0m high barrier between the gardens and the quarry. Detailed break in calculations have then been undertaken for all noise sensitive rooms for each plot type. The required glazing and ventilation schemes to achieve required guideline values are detailed in Appendix B.

5.3.2 The glazing and ventilation requirements detailed in Appendix B will allow for passive ventilation to be provided in noise sensitive rooms with windows closed. It is considered that purge ventilation can be provided via extractor fans in kitchen/bathrooms and through the occasional opening of windows as required.

5.3.3 The sound reduction data, of the glazing and ventilation specified is detailed in Appendix C.

6 CONCLUSIONS

6.1.1 Wardell Armstrong has carried out a noise assessment for the proposed residential development at Tearne Quarry, Hollington.

6.1.2 The dominant noise source, which will potentially affect the residents of the proposed development, is the operations associated with Tearne Quarry, located to the south of the proposed development site.

6.1.3 In policy terms there is no presumption against development in places with high noise levels, provided that the noise can be adequately mitigated taking into account the economic and social benefits of the proposed scheme.

6.1.4 To establish noise levels at the site, attended noise surveys have been undertaken at the development site. The resultant noise levels have been assessed against relevant guidance documents.

6.1.5 In accordance with relevant guidance, to ensure that the background noise level is not exceeded by more than 10dB in outdoor living areas, a 4.0m high barrier or barrier/bund combination will be required between outdoor living areas located closest to Tearne Quarry, and the quarry itself

6.1.6 Detailed noise break-in calculations have been prepared for each room, within each proposed dwelling, based upon measured noise data, and the mitigation provided by standard thermal double glazing. The results of the calculations are shown in Appendix B.

6.1.7 The calculations show the glazing and ventilation needed to each property to ensure that acceptable noise levels are provided in each noise sensitive room. The development is therefore acceptable in noise terms with the appropriate glazing and ventilation scheme in place.

Appendix A

Noise Monitoring Results

Appendix A

Noise Monitoring Results

Monitoring Location 1 – Nearest Residential Receptor at The Old Post Office (adjacent to site)						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
28/09/2017 Daytime						
0942 – 1042	48.7	30.1	71.3	33.8	51.4	Noise from road traffic on Hollington Road dominant, occasional cars and agricultural vehicles. Frequent birdsong, dog barking and distant aircraft. Low level engine noise constant, with intermittent drilling noise, HGV movements, occasional noise from gas compressor and banging audible during monitoring.

Monitoring Location 2 – Approximately 2m from the southern site boundary						
Time	**L_{Aeq} (dB)**	**$L_{A\ min}$ (dB)**	**$L_{A\ max}$ (dB)**	**L_{A90} (dB)**	**L_{A10} (dB)**	**Comments**
06/10/2017 Daytime						
0950-1313	57.1	30.6	80.6	37.9	59.4	Dominant noise from operations at the quarry. Occasional noise from road traffic on Hollington Lane. Noise from livestock in nearby fields. Birdsong

Appendix B

Glazing and Ventilation Scheme

Plot Number	House Type	Room		Glazing and Ventilation Requirements
1		Lounge/Dining	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
2		Lounge/Dining	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
3		Lounge/Dining	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
4		Lounge/Dining	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
5		Kitchen/Dining	1	Open Window for Ventilation
		Lounge	1	Open Window for Ventilation
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		2nd Flr Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
6		Kitchen/Dining	1	Open Window for Ventilation
		Lounge	1	Open Window for Ventilation
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		2nd Flr Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
7		Lounge/Dining	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Front Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
8		Lounge/Dining	1	Open Window for Ventilation
		Front Bedroom	1	Open Window for Ventilation
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
9		Kitchen/Dining	1	Open Window for Ventilation
		Lounge	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Dining	1	Open Window for Ventilation
		Study	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Master Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Rear Bedroom	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Bedroom 3 NW	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2
		Bedroom 4 NE	2	Standard Glazing 4/12/4 & Greenwood 5000EAW.AC2

Appendix C

Sound Reduction Data

Appendix C

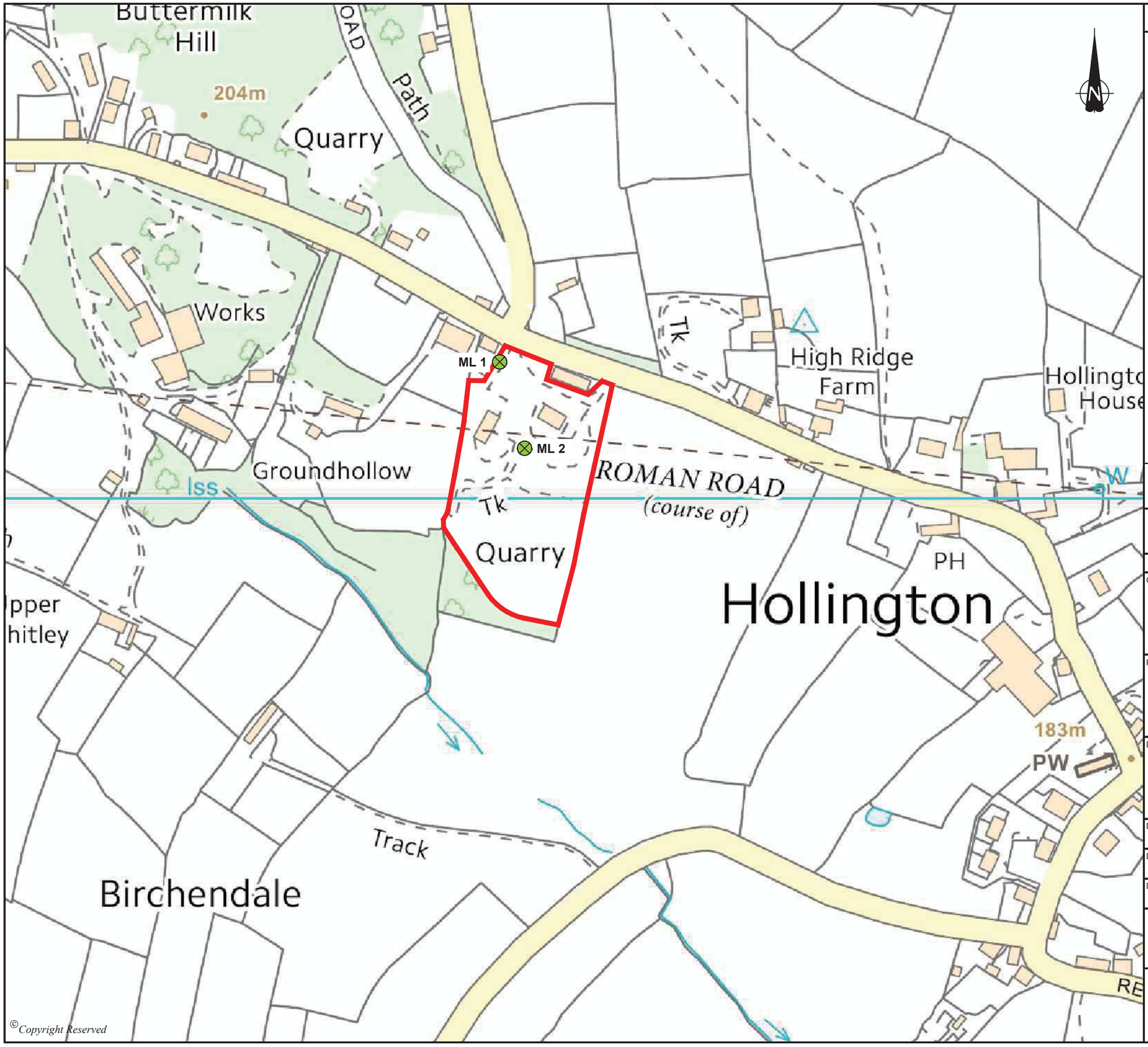
Example Glazing and Ventilation Attenuation Requirements

Glazing Type	Octave Band Frequency, Hz							
	63	125	250	500	1000	2000	4000	8000
4/12/4	18	24	20	25	23	29	35	35

Ventilation Type	Octave Band Frequency, Hz							
	63	125	250	500	1000	2000	4000	8000
Greenwood 5000EAW.AC2	30	41	40	38	47	44	47	47

Drawings

Noise Monitoring Locations



DO NOT SCALE FROM THIS DRAWING

REFERENCE

SITE BOUNDARY

NOISE MONITORING RECEPTOR LOCATION

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
B	ML2 and ML3 removed, drawing re-numbered	22-11-17	DR	LE	MW
A	First Issue	10-10-17	DR	LE	MW

CLIENT: Hollington Stone Quarries Ltd

PROJECT: Tearne Quarry

DRAWING TITLE: Noise Monitoring Locations

DRG No.	REV
LE14096-002	B

DRG SIZE	SCALE	DATE
A3	1:2500	10-10-17

DRAWN BY	CHECKED BY	APPROVED BY
DR	LE	MW

■ LEIGH TEL 0194 226 0101 WEB: WWW.WARDELL-ARMSTRONG.COM

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