



Miller Goodall

Environmental Services

NOISE ASSESSMENT

on behalf of

THE HUNTROYDE ESTATE

for the site at

320120861P

MILTON AVENUE, CLITHEROE

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Summary

A noise impact assessment has been undertaken for a proposed residential development located in the vicinity to Milton Avenue, Clitheroe. The potential increase in road traffic noise levels as a result of the development has been predicted using noise modeling software and the subjective impact assessed in accordance with recognised guidance. Measurements of the existing noise levels on Milton Avenue were made in order to validate the predicted baseline conditions.

The document presents the findings of the assessment. The traffic flow data that provided the basis of the assessment are provided in the Appendix, together with screen shots from the noise model.

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[Signature]

Date

25th September 2012

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1 Introduction

Miller Goodall Environmental Services Ltd (MGES) has, on behalf of The Huntroyde Estate of Huntroyde Estate Office, Padiham, Lancashire BB12 7QX, undertaken a noise assessment in respect of the impact of noise from road traffic from a proposed residential development in the vicinity of Milton Avenue in Clitheroe, Lancashire.

2 Site Description

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The site is located to the south of Milton and Cowper Avenues to the north west of Clitheroe town centre. To the north and south of the site lies residential property and to the west lies agricultural land. To the east lies a mixture of residential and commercial uses and Clitheroe Park and Ride facility. Appendix 1 shows the location of the site.

3 Proposed Development

The proposal is to develop a greenfield site of approximately 1.23 hectares for residential use involving the erection of 50 dwellings. Road access to the development site is located at the end of Milton Avenue. The mix of dwellings has not been fixed and layout is reserved for consideration at a later date. However, a master plan has been provided to the Local Authority and is shown in Appendix 2.

An outline planning application for the development on this site was refused permission on 20th July 2012 for the following reason:

"The proposed development is considered contrary to Policy G1 of the Ribble Valley District wide Local Plan in that it would have an adverse impact on the operation of the highway network to the detriment of highway safety and to the general amenities of the area."

This assessment seeks to address the issue of potential noise impact resulting from road traffic associated with the development.

4 Policy Context

National, regional and local policies relating to noise were used to inform the scope of the noise assessment. These are discussed in the following sections:

4.1 National Planning Policy and Guidance

The Noise Policy Statement for England (NPSE), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy Aims, as presented in this document, are:

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

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

The National Planning Policy Framework (NPPF) was published in March 2012. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) “Planning and Noise”.

Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) “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, water or noise pollution or land stability”.

The NPPF goes on to state in Paragraph 123 “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 thorough 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 use 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”.

The NPPF document does not refer to any other documents regarding noise other than NPSE.

4.2 BS 8233:1999

BS 8233:1999 – ‘Sound Insulation and Noise Reduction for Buildings – Code of Practice’ gives recommended design criteria for internal noise levels for different types of rooms within residential dwellings. This design criteria are based on guidance contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999). The criteria for bedrooms and living rooms, which have been set to avoid sleep disturbance and ensure suitable living/resting conditions are shown in Table 1 below

Table 1: BS 8233: 1999 recommended sound levels in habitable rooms

Room	Criteria	Reasonable ($L_{Aeq,T}$)	Good ($L_{Aeq,T}$)
Bedrooms	Sleeping	35	30
Living Rooms	Resting	40	30

In addition to the above, this document recommends that maximum noise levels (L_{Amax}) of individual noise events should not normally exceed 45 dB in bedrooms at night. BS 8233:1999 does not provide guidance on how this may be interpreted, however a criteria of between 10-15 times per night-time period has commonly been adopted.

4.3 World Health Organisation (WHO) Guidelines for Community Noise 1999

The WHO Guidelines 1999 state that external amenity areas should not be subjected to daytime averaged noise levels greater than L_{Aeq} 55 dB, and preferably below L_{Aeq} 50 dB.

4.4 Calculation of Road Traffic Noise and Design Manual for Roads and Bridges

With respect to changes in road traffic noise levels, the documents 'Calculation of Road Traffic Noise' (1988) and the 'Design Manual for Roads and Bridges (DMRB): Volume 11 Environmental Assessment' (1994) which was updated in November 2011 are both relevant. Both of these documents contain guidance on predicting and assessing changes in road traffic noise due to factors such as increased traffic volumes, changes to the local road network, etc.

Guidance and a methodology for calculating changes in road traffic noise are detailed in the DfT publication Calculation of Road Traffic Noise (CRTN) 1988. This methodology combines data on road traffic flows, mean traffic speeds and traffic composition in terms of percentage of Heavy Goods Vehicles (HGV), road and site layouts in order to calculate and predict road traffic noise at a selected location. A methodology for the calculation of hourly road traffic noise is also presented. The $L_{10(18-hour)}$ parameter has historically shown a good correlation with community response to road traffic noise and is often referred to as the 'UK traffic noise index'.

DMRB is accepted as the standard methodology within the United Kingdom for evaluating the noise impacts of road traffic resulting from road projects. This guidance provides a classification of magnitude, in terms of changes in road traffic noise, as presented in Table 3.1 of the document, reproduced below as Table 2. This table is used to assess the noise magnitude criteria used in the determination of significance later in this statement.

Table 2 DMRB Classification of Magnitude of Noise Impacts in the Short Term

Change in Noise Level dB(A)	Magnitude of Noise Impact
0	No change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
>5	Major

DMRB does not provide any definitive methodology for assessing potential noise and vibration impacts from construction traffic but the guidance does refer to construction traffic in discussing potential impacts that may occur as part of a road scheme in Paragraph 2.6. According to the guidance, a 25% increase in traffic flows will result in only a 1 dB(A) increase in road traffic noise levels. Conversely, a 25% reduction in traffic flows will result in a decrease of 1 dB(A) in road traffic noise levels.

4.5 The Noise Insulation Regulations 1975

Under the Noise Insulation Regulations 1975 (as amended), dwellings and other places used for residential purposes may qualify for an offer of noise insulation if the following conditions are satisfied at 1 m in front of the most exposed door or window of an eligible room in the facade of a property:

1. The noise level in the design year must be greater than or equal to 68 dB(A) $L_{10(18\text{-hour})}$. Predicted noise levels of 67.5 dB(A) $L_{10(18\text{-hour})}$ and above are rounded up to 68 dB(A) $L_{10(18\text{-hour})}$.
2. The noise level in the design year, or within any other year between the year before construction works commenced and the design year, must be increased by at least 1.0 dB(A) $L_{10(18\text{-hour})}$ when compared to the noise level predicted in the year before construction works commenced.
3. Noise from the new or altered road contributes at least 1.0 dB(A) $L_{10(18\text{-hour})}$ to the total noise level.

All three of the above conditions must be met concurrently for a property to qualify under the Noise Insulation Regulations. In addition, the property must not be more than 300 m from the nearest point of the new or altered carriageway. The Regulations apply only to qualifying eligible rooms, which include living rooms and bedrooms affected by road traffic noise.

Under Regulation 3 there is a mandatory requirement for the appropriate authority to make an offer of noise insulation where the facade qualifies with respect to traffic noise from a new road. Regulation 4 provides discretionary powers to the appropriate highways authority with respect to altered roads.

5 Impact Assessment for Road Traffic Noise

5.1 Baseline Noise Conditions

The existing baseline traffic noise level at Milton Avenue has been both measured and assessed using road traffic flow data provided by the transport consultant and the prediction methodology within CRTN. The traffic flows along Milton Avenue for both baseline and with-development scenarios are below 1000 vehicles per day and CRTN advises that for roads with daily flows <1000 vehicles/18 hour the noise level calculations using the prediction methodology may be unreliable. It recommends measurements should be taken when evaluating such cases. Therefore measurements of road traffic noise were undertaken on Milton Avenue.

Section III of CRTN provides guidance on the measurement of road traffic noise. A shortened measurement procedure is provided in Paragraph 43 which may be used if the future predicted values of $L_{10(18\text{-hour})}$ estimated in this way are in excess of 69.0 dB(A) or below 66.0 dB(A).

The shortened measurement procedure involves taking measurements of $L_{10(1\text{-hour})}$ over any three consecutive hours between 10:00 and 17:00 and calculating the arithmetic mean to give a value of $L_{10(3\text{-hour})}$. The current value of $L_{10(18\text{-hour})}$ is then calculated as follows:

$$L_{10(18\text{-hour})} = L_{10(3\text{-hour})} - 1 \text{ dB(A)}$$

The measurement location chosen was on the pavement at the southern end of Milton Avenue, close to the proposed access point for the development. This location was approximately 1.5 m from the nearside road edge and approximately 3 m from the facade of the nearest house at 19 Milton Avenue. The microphone was located at a height of 1.2 m under free-field conditions.

Measurements were made on Friday 31st August 2012 commencing at 13:40. Weather conditions during the survey were dry, overcast with a temperature of 15°C and a light westerly breeze of 2 – 3 m/s. Light rain began to fall at around 15:50 and measurements were cut short due to the rain at 16:05, 25 minutes into the 3rd hourly measurement.

A second set of noise measurements were made on Wednesday 19th September 2012, in order to address any differences in traffic flows which may occur during school term time periods. Weather conditions during this second survey were overcast with a temperature of 13°C and a light westerly breeze of 4 – 5 m/s. Consecutive 3 hourly noise measurements were made at the same location on Milton Avenue. On the day of measurements the weather had been wet intermittently throughout the morning however the roads had sufficiently dried by 14:30 to allow measurements to commence.

Table 3 below shows the equipment used during the surveys.

Table 3: Measurement equipment used during survey

Equipment Description	Type Number	Manufacturer	Serial No:	Date calibrated	Calibration Certification Number
Class 1 Integrating Real Time 1/3 Octave Sound Analyzer	Type 2260	Brüel & Kjær	2467009	15.09.11	C1107367
Calibrator	Type 4231	Brüel & Kjær	2478249	24.08.12	01010/1
Microphone	Type 4189	Brüel & Kjær	2508884	15.09.11	C1107367

The equipment used was calibration checked before and after measurements, with negligible deviation (<0.1 dB). The equipment has been externally calibrated in the two years prior to use and calibration certificates were issued by the calibrating laboratory.

During the monitoring period the noise sources within the vicinity of the measurement location were identified as follows:

- Noise from local residents' vehicles on Milton Avenue
- Noise from vehicles using Milton Avenue as a through road to and from Waddington Road, including light goods vehicles
- Noise from distant road traffic on Waddington Road
- Noise from occasional passing pedestrians
- Occasional noise from neighbours talking.

A summary of the baseline noise monitoring results can be seen in Table 4 below: Full results are presented in Appendix 3 of this statement

Table 4: Summary of noise measurements

Date	Start Time	Elapsed Time (min:sec)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{AF10} (dB)	L_{AF90} (dB)	L_{AFmin} (dB)
31/8/2012	13:40:25	1:00:00	50.9	81.5	50.5	38.2	33.9
31/8/2012	14:40:35	1:00:00	49.8	77.3	50.2	38.3	34.7
31/8/2012	15:41:42	0:25:50	52.1	69.0	54.9	41.9	37.1
19/9/2012	14:34:12	1:00:00	46.5	75.3	47.6	39.7	40.3
19/9/2012	15:38:39	1:00:00	50.9	81.1	49.7	38.3	40.8
19/9/2012	16:43:08	1:00:00	50.7	88.9	48.4	41.9	40.5

The $L_{10(18\text{-hour})}$ is calculated as follows:

$$L_{10(18\text{-hour})} = L_{10(3\text{-hour})} - 1 \text{ dB(A)}$$

Therefore, for 31st August the calculated value of $L_{10(18\text{-hour})} = 51.9 - 1 = 50.9 \text{ dB(A)}$

and for 19th September $L_{10(18\text{-hour})} = 48.6 - 1 = 47.6 \text{ dB(A)}$

5.2 Prediction of Road Traffic Noise Levels

Predictions of both baseline and future traffic noise generated by the development have also been undertaken using the CadnaA computer modelling package. This software uses the prediction algorithms within CRTN to calculate the $L_{10(18\text{-hour})}$ noise level at representative receptors along Milton Avenue (termed by CRTN as the Basic Noise Level or BNL).

The BNL has been corrected by the software to account for the following variables:

- Percentage HGVs: from transport consultant
- Traffic speed: 25 km/h (15.5 mph) on Milton Avenue and on development roads, 50 km/h (31 mph) on other roads
- Road surface: assumed impervious, bituminous with a texture depth of 5 mm
- Correction for low traffic flows

The effect of facade reflections from surrounding buildings has been incorporated into the model via mirror source calculations and two orders of reflection. Although accurate topographical data was collected for the development site, this data was not available for the surrounding area. However, since the immediate area of interest (within around 200 m radius of Milton Avenue) is predominantly flat, the effect of any change in gradient on road traffic noise levels will be minimal and as such it is considered the omission of topographical data from the model will not affect the predictions significantly.

Baseline traffic flow data and percentage HGVs for AM and PM peak hours (08:00 – 09:00 and 16:45 – 17:45) on Milton Avenue and the surrounding roads was measured by the transport consultant. This was subsequently corrected to provide an overall 24 hour weekday traffic flow for each segment of road. The traffic counts used within the assessment are provided in Appendices 4, 5 and 6.

By comparing the baseline and development scenarios, the relative change in noise levels, and subsequently the potential impact, can be established for each affected dwelling.

It is customary to utilise traffic flow data for the period 06:00 – 24:00, i.e. 18 hour flows, for the prediction of the $L_{10(18\text{-hour})}$. It is considered, however, that the use of 24 hour flow data will not adversely affect the outcome of the assessment since this is based on a comparison of noise levels with and without the development, rather than absolute noise levels.

5.3 Validation of the Noise Model

A noise level receptor point was incorporated into the CadnaA model at the noise survey measurement location to compare the predicted baseline $L_{10(18\text{-hour})}$ to the measured $L_{10(18\text{-hour})}$

The $L_{10(18\text{-hour})}$ predicted by the model was 52.4 dB(A); this is 1.5 dB(A) higher than the actual value of 50.9 dB(A) determined by measurement on 31st August. This difference is most likely accounted for by the fact that 24 hour traffic flow data was used within the model to determine the predicted noise level. The measured value of 47.6 dB(A) $L_{10(18\text{-hour})}$ from 19th September is 4.8 dB(A) lower than the predicted value. This suggests that term-time noise levels are in fact no higher than those levels measured during the school holidays. It is possible that the higher noise level measured on 31st August may be attributable to a higher volume of traffic experienced on a Friday afternoon compared with that experienced on a Wednesday afternoon.

It is generally accepted that a sound level difference of 1 dB is the lowest that the human ear can distinguish under ideal (laboratory) conditions. Under typical conditions, the lowest distinguishable difference is around 3 dB. In the case of the noise model, the predicted noise level is slightly higher than the measured noise level; this over-prediction therefore presents a worst case baseline condition.

5.4 Analysis of the Impact of Road Traffic Generated by the Development

Following the guidance in DMRB as described earlier, the magnitude of the impact as a result of the changes in road traffic noise for the dwellings located closest to the proposed development are shown in Table 5 below.

Table 5: Predicted impact of development on road traffic noise levels

Receptor	Baseline Noise Level dB(A) $L_{10(18\text{-hour})}$	With Development Noise Level dB(A) $L_{10(18\text{-hour})}$	Difference dB(A) $L_{10(18\text{-hour})}$	Magnitude of Noise Impact to DMRB
1 Milton Ave	54.4	55.9	1.5	Minor
2 Milton Ave	55.0	56.1	1.1	Minor
3 Milton Ave	53.6	55.5	1.9	Minor
4 Milton Ave	53.1	54.8	1.7	Minor
5 Milton Ave	52.8	55	2.2	Minor
6 Milton Ave	53.1	54.8	1.7	Minor
7 Milton Ave	52.4	54.6	2.2	Minor
8 Milton Ave	51.9	54	2.1	Minor
9 Milton Ave	51.8	54.2	2.4	Minor
10 Milton Ave	51.5	53.7	2.2	Minor
11 Milton Ave	51.4	53.9	2.5	Minor
12 Milton Ave	51.4	53.1	1.7	Minor
13 Milton Ave	51.1	53.7	2.6	Minor
15 Milton Ave	50.6	53.5	2.9	Minor
17 Milton Ave	50.3	53.4	3.1	Moderate
19 Milton Ave	50.2	53.7	3.5	Moderate
77 Waddington Road	64.6	64.8	0.2	Negligible
79 Waddington Road	64.6	64.8	0.2	Negligible
81 Waddington Road	64.6	64.8	0.2	Negligible
83 Waddington Road	64.6	64.8	0.2	Negligible
85 Waddington Road	64.6	64.7	0.1	Negligible
87 Waddington Road	64.6	64.8	0.2	Negligible
89 Waddington Road	64.5	64.7	0.2	Negligible
91 Waddington Road	64.6	64.8	0.2	Negligible

The model indicates that the most significant impacts occur at numbers 17 and 19 Milton Avenue i.e. the dwellings closest to the proposed site entrance where the predicted increase in noise level is just over 3 dB $L_{10(18\text{-hour})}$. The predicted impact is 'minor' or negligible for the remainder of the dwellings considered, with the impact reducing with distance from the site entrance where the noise from existing flows is higher.

Notwithstanding the predicted subjective impact, occupants of the affected dwellings on Milton Avenue would not qualify for any mitigation under the Noise Insulation Regulations as only two of the three conditions are predicted to be met; namely noise level in the design year has increased by at least 1.0 dB(A) compared to the baseline level and the noise from the new road contributes at least 1.0 dB(A). The third condition that has not been met is a minimum noise level of 68 dB(A) $L_{10(18\text{-hour})}$. This level is measured at a distance of 1m from the facade of the building. As CadnaA predicts a free-field noise level, a facade correction of +2.5 dB (as stated within CRTN) would need to be applied to the predicted noise levels in Table 5. Even with the facade correction applied, the 68 dB(A) $L_{10(18\text{-hour})}$ qualification level would not be met.

It is also useful to illustrate the potential impact of noise levels in terms of the BS 8233 and WHO recommended internal noise levels. These are based on the L_{Aeq} metric, rather than the $L_{10(18\text{-hour})}$ metric. There is no standard way of converting $L_{10(18\text{-hour})}$ levels to L_{Aeq} levels, although the Planning Policy Guidance

24 (PPG24), which has been superseded by the National Planning Policy Framework, suggested the following relationship where daytime noise levels are in excess of 63 dB $L_{Aeq, 16hr}$:

$$L_{Aeq, 16hr} \approx L_{10(18-hour)} - 2 \text{ dB}$$

At low traffic flows when noise levels are below 63 dB $L_{Aeq, 16hr}$, the relationship between $L_{Aeq, 16hr}$ and $L_{10(18 \text{ hour})}$ may not always conform to the above estimate. However, with this proviso in mind, the L_{Aeq} may be approximated by subtracting 2 dB from the noise levels in Table 5. This results in a daytime noise level on Milton Avenue with the development in place of around 52 - 54 dB L_{Aeq} . Based on the rule of thumb of 10 – 15 dB attenuation provided by a window open for ventilation (as referenced in BS 8233 and WHO), the BS 8233 ‘reasonable’ daytime internal noise levels within living rooms would be achieved. With windows closed, the ‘good’ levels would also be achieved (assuming the houses have standard thermal double glazing). Furthermore, the WHO daytime noise criterion within gardens (55 dB L_{Aeq}) is also predicted to be met.

6 Discussion and Conclusion

A noise assessment was undertaken to predict the impact of changes to road traffic noise as a result of a proposed residential development in the vicinity of Milton Avenue, Clitheroe. Computer noise modelling was utilised in addition to baseline noise measurements and the potential impact on existing residents was determined using guidance provided in DMRB.

The assessment concluded that the predicted increase in noise levels equated to a ‘negligible’ or ‘minor’ impact for the majority of residents. The impact for residents of two properties on Milton Avenue closest to the proposed development was predicted to fall within the ‘moderate’ range. Absolute noise levels at properties on Milton Avenue due to road traffic with the development will be within the “reasonable” category for habitable rooms with windows open and with windows closed will meet the “good” criteria as described in BS 8223. No additional mitigation measures to control noise are recommended.

Glossary of Terms

Decibel (dB) The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μPa , the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions

dB(A) Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB (A) broadly agree with people's assessment of loudness. A change of 3 dB (A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 meter; heavy road traffic about 80 dB(A) at 10 meters; the level near a pneumatic drill about 100 dB(A).

$L_{A90,T}$ The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1990 it is used to define background noise level.

$L_{Aeq,T}$ The equivalent continuous sound level. The sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter

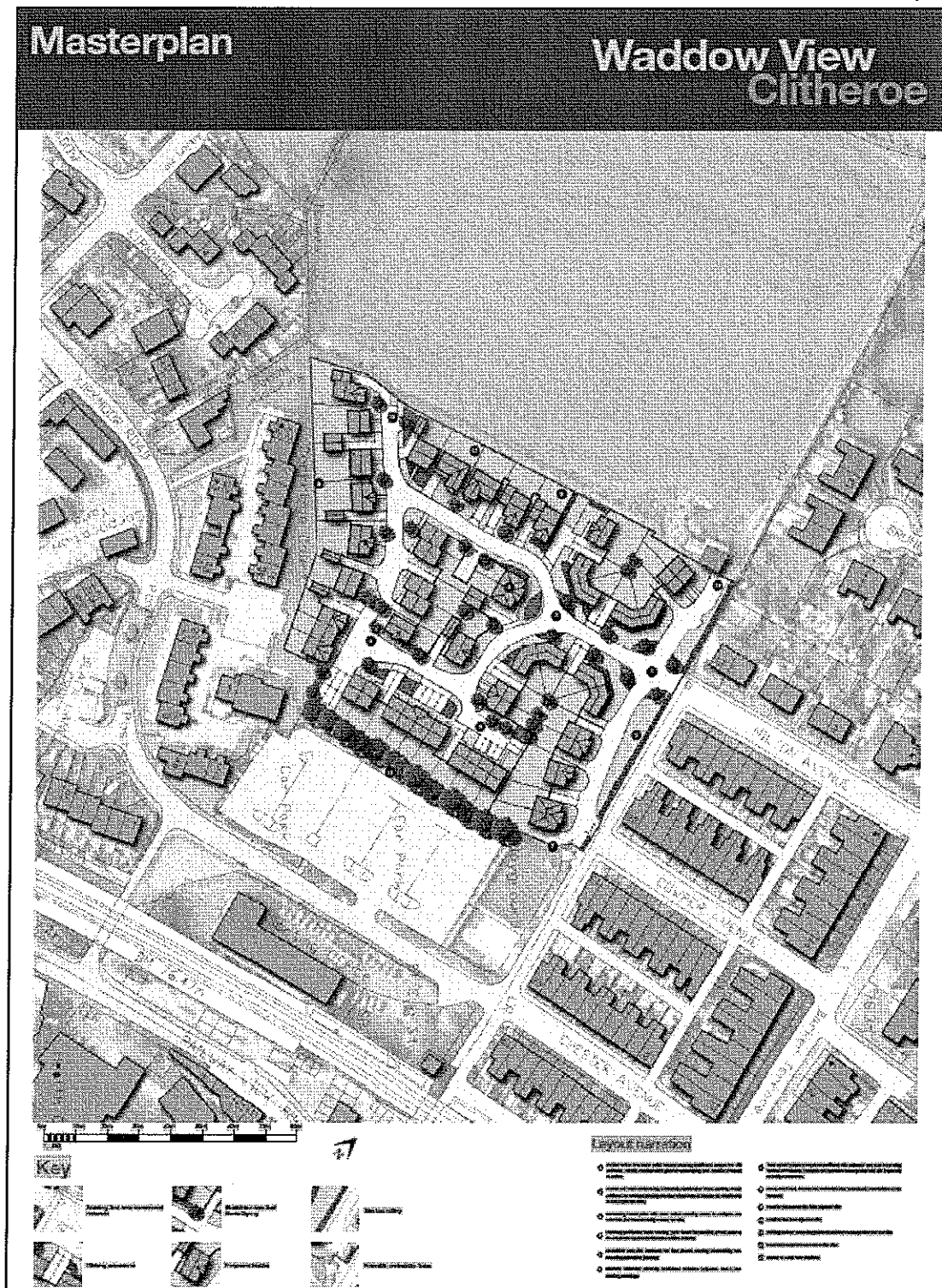
L_{Amax} The highest A weighted noise level recorded during the time period. It is usually used to describe the highest noise level that occurred during the event

Appendix 1: Site Location



Appendix 2: Masterplan

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Appendix 3: Baseline traffic flows

Worst case flows - 24 hr (existing)											
Eastham Street			Park Avenue								
905 827			82 161								
Waddington Road		1752	2504	2485	2627		2678	4034			
		631	1434	2497	2602		1984	3987			
		43 16	200 243				2772	2819			
			Chester Ave								
Milton Ave											
			Railway View Road								
0 0											
Site access											

Appendix 4: Development traffic flows

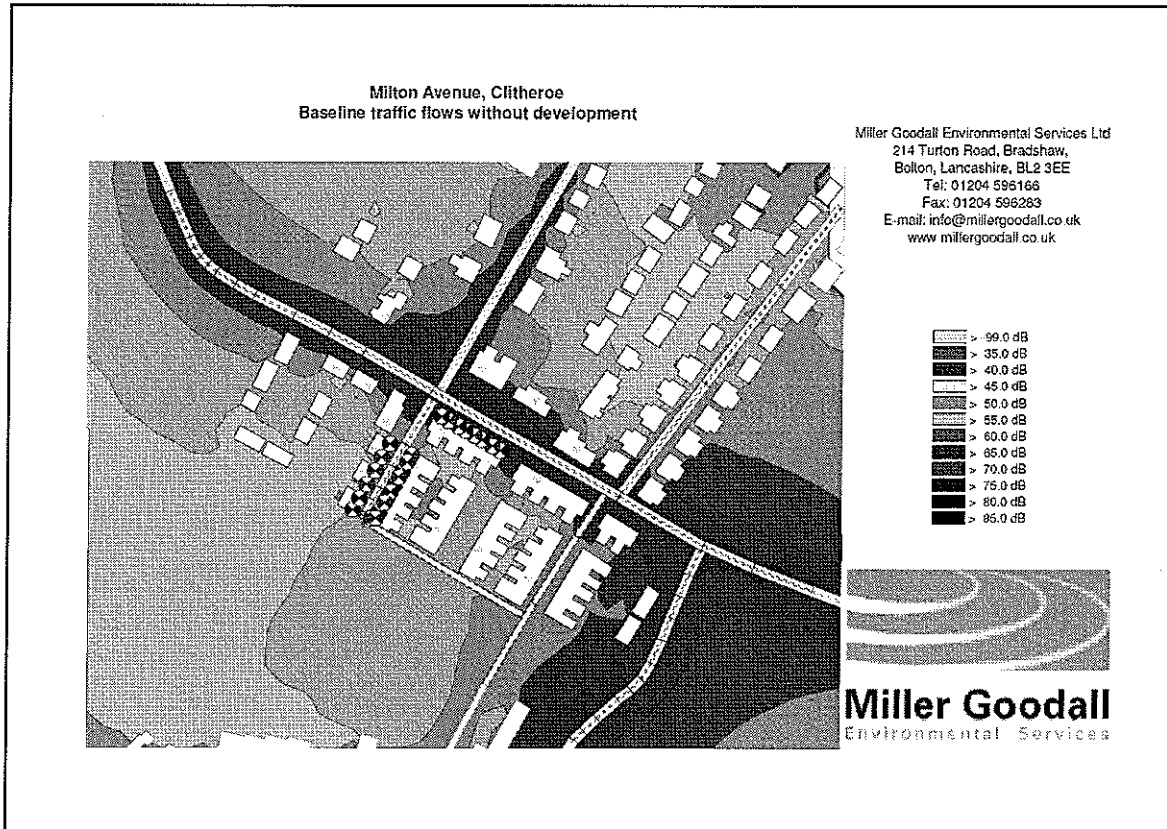
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lows

Worst case flows - 24 hr (scheme only)										
Eastham Street		Park Avenue								
0.0		0.0								
Waddington Road	21	71	71	71	71	71	61			
	60	106	106		106	106	67			
	131	127	0.0				39	10		
			Chester Ave							
Milton Ave										
		Railway View Road								
131		127								
Site access										

Appendix 5: Combined baseline and development traffic flows

Worst case flows - 24 hr (combined existing and scheme)						
Eastham Street		Park Avenue				
	905	827		82	161	
Waddington Road	1773	2575	2557	2698	2749	4695
	691	1540	2603	2708	2090	4054
	174	143	200	243	2811	2829
		Chester Ave				
	Milton Ave					
		Railway View Road				
	131	127				
	Site access					

Appendix 6: CadnaA noise model for baseline traffic flows



Appendix 7: CadnaA noise model for traffic flows with development

