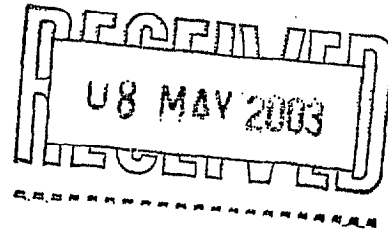


**APPENDIX 5:
TMS Monitoring Results (dust and noise results)**

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DUST DEPOSITION ASSESSMENT

AT

ROBINHOOD INDUSTRIAL ESTATE

FOR

OXIGEN ENVIRONMENTAL LTD

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Prepared by:

Orla McAlister
Orla McAlister

Report Ref. 5813
TMS Environment Ltd.
6th May 2003

Approved by:

Ian Byrne
Ian Byrne

1.0 Scope

This report presents the results of a dust deposition survey, which was carried out at three locations (D-1 to D-3) around the boundary of the Oxigen Environmental Ltd waste transfer facility in Robinhood Industrial Estate, Dublin 22, as per the requirement of Schedule C.2 of Waste Licence Reg. No. 152-1.

2.0 Methodology

The survey was conducted by TMS Environment Ltd personnel during the period 12th March 2003 to 9th April 2003. The procedure employed for this survey was Standard Method VDI 2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Institute).

The dust deposition rate was measured by positioning three Bergerhoff Dust Deposit Gauges at strategic locations near the boundaries of the site for a period of 28 days. The selection of sampling point locations was completed after consideration of the requirements of VDI 2119 with respect to the location of the samplers relative to buildings and other obstructions, height above ground and sample collection and analysis procedures. After the exposure period was complete, the Gauges were removed from the site; the dust deposits in each Gauge were determined gravimetrically and expressed as a dust deposition rate in mg/m²-day in accordance with the relevant standards.

3.0 Results

The measurement results are presented in Table 1.

Table 1

Dust deposition rate, Oxigen Environmental Ltd waste transfer facility in Robinhood Industrial Estate, Dublin 22.

SAMPLING POINT	DUST DEPOSITION RATE mg/m ² -day
Northern boundary, to NW: D-1	397
Northern boundary, to NE: D-2	995
South western corner of site: D-3	349

4.0 Evaluation of results

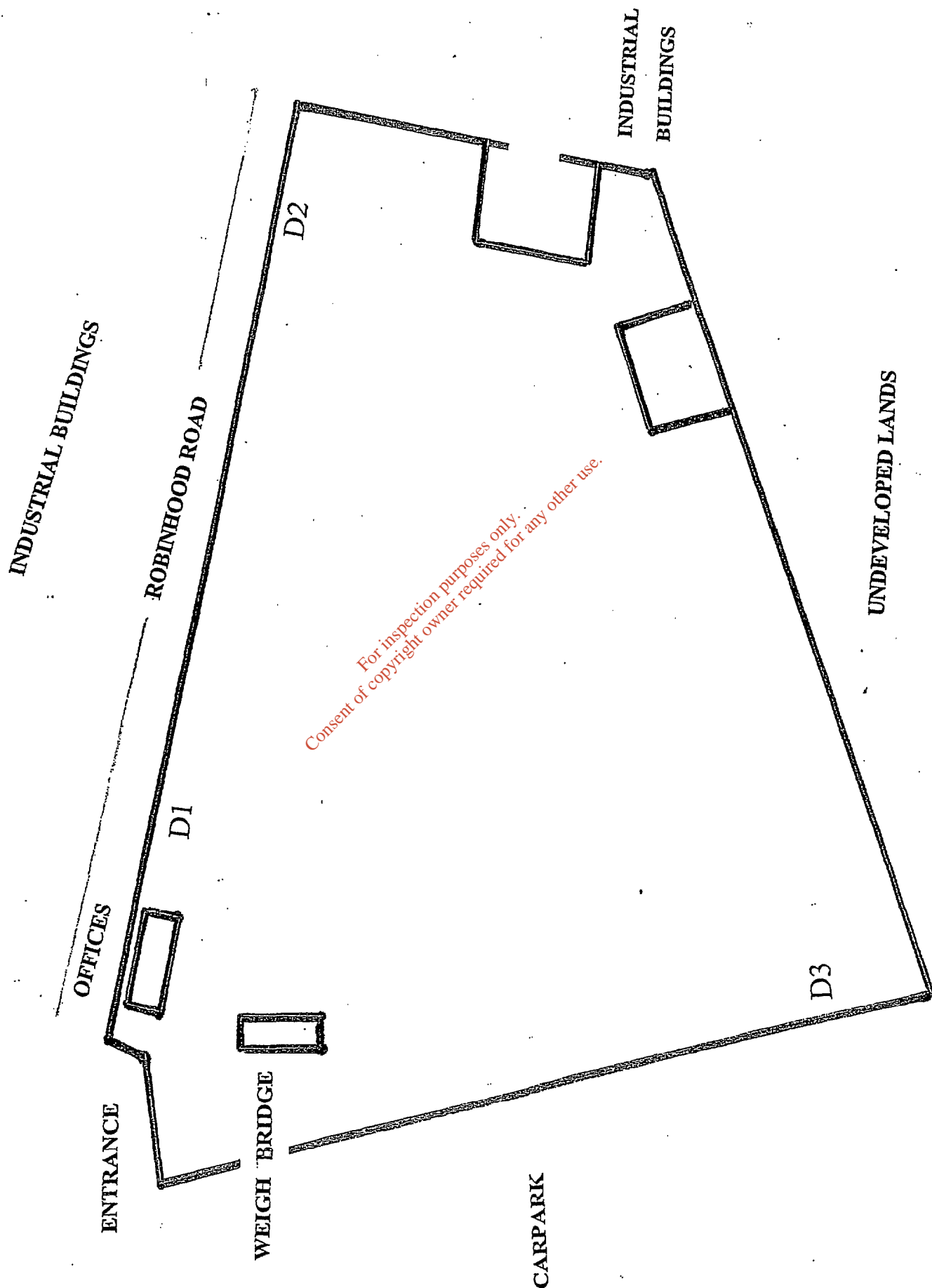
Dust measurements were completed at three locations (D-1 to D-3) within 5m of the boundaries of the site. A measurement frequently used in connection with air quality assessments where dust emissions may be significant is Dust Deposition Rate, which is normally measured by gravimetrically determining the mass of particulates and dust deposited over a specified surface area over a period of one month (28 days). The results are expressed as dust deposition rate in mass per unit area per day.

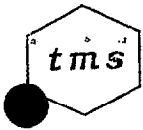
The Company's Waste Licence (Reg. No. 152-1), specifies a dust deposition limit of 350 mg/m²/day at the site boundaries. The results presented in Table 1 show that the limit value was exceeded at 2 of the 3 monitoring locations (D1 and D2).

The highest concentrations of dust were collected at D-1 and D-2, both of which are adjacent to the road running along the northern site boundary. The elevated dust levels at these locations may be attributed to both the waste handling operations and dust generated by high volumes of traffic on the busy Robinhood road, which borders the northern site boundary. A high volume of Heavy Goods Vehicles pass the site during the day and have a significant impact on the dust levels at these points, particularly during the dry weather. D-2, in the north east corner of the site has the highest concentration of dust. The dust deposition at D1 and D2 exceed the licence limit. The lowest dust deposition was noted at D3, as has previously been the case. The deposition at this location at 349 mg/m²/day was greater than usual, however it is within the licence limit.

Elevated dust levels recorded at the site may also be attributed to the demolition works area along the boundary of the site. It is recommended that regular cleaning and wetting of yard areas is conducted during dry or windy periods, in order to minimise the potential for dust generated by site activities to extend beyond the site boundaries.

Figure 1 Oxygen Environmental Ltd, Robinhood Road. Schematic drawing of site layout.





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NOISE MONITORING SURVEY

FOR

OXIGEN ENVIRONMENTAL LTD.,

AT

ROBINHOOD ROAD, DUBLIN 22.

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DAVID DUFF

OXIGEN ENVIRONMENTAL LTD.

Prepared by:

Cyril Tynan

Report by TMS Environment Ltd
Report Ref. 7299
23rd June 2004

Approved by:

Dr. Imelda Shanahan

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2.0 REGIONAL ENVIRONMENTAL SETTING

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3.2 INSTRUMENTATION AND METHODOLOGY

3.3 SURVEY IMPLEMENTATION

4.0 SURVEY RESULTS

5.0 EVALUATION OF RESULTS

6.0 CONCLUSIONS

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APPENDIX I **1/3 octave band frequency analysis results and graphs**

APPENDIX II **Calibration certificates**

1.0 Scope

This report presents the results of an environmental noise survey carried out at 5 locations at the site boundaries of the Oxigen Waste Facility, Robinhood Industrial Estate, Robinhood Road, Dublin 22. In addition, the results of an octave band frequency analysis survey carried out at the site are also presented. The noise survey was conducted as per the requirements of Schedule C of Waste Licence Reg. No. 152-1. The noise generating activities relate to the delivery, tipping, handling, reloading and removal of waste to and from the site. This survey was conducted during daytime operational hours.

2.0 Regional environmental setting

The site of Oxigen Environmental Ltd is located in Robinhood Industrial Estate, Robinhood Road, Dublin 22. The site is triangular in shape with the Northern boundary of the site being parallel to Robinhood road. The premises of Tibbett and Britten group (Ireland) Ltd. and associated carpark is situated to the west of the site. The Southern boundary of the site is adjacent to undeveloped lands. Industrial premises border the eastern boundary wall.

Due to the industrial nature of the area, a very high volume of traffic uses Robinhood road during the day. During the course of this survey, it was noted that as well as traffic associated with Oxigen Environmental Ltd, there is a constant volume of heavy goods vehicles and articulated vehicles idling or parked along the length of Robinhood road in connection with the other premises situated close to the Oxigen Environmental Ltd. facility.

3.0 Survey Protocol

3.1 Choice of measurement positions

The locations chosen for the survey were at points along the boundary walls of the site, (N1, N2, N3, N4 and NSR1), Figure 1. The purpose of selecting the boundary locations was to evaluate the noise being generated during normal daytime working conditions at the site.

The monitoring points chosen for locating the noise measuring instrument were chosen according to the guidelines in ISO 1996: Acoustics - Description and Measurement of Environmental Noise. In all cases, the sound level meter was located 1.5m above ground and at least 3.5m away from any sound reflecting objects. A windshield was placed on the microphone to reduce any wind interference during measurements. A description of the monitoring points is presented in Table 1. An octave band frequency analysis survey was also carried out at N1, N2, N3, N4 and NSR1 and a graphical representation of the results is presented in Appendix I.

3.2 Instrumentation and methodology

The measurements were made according to the requirements of ISO 1996: Acoustics - Description and Measurement of Environmental Noise. The measurements were made using a Cirrus 831A Data logging integrating sound level meter fitted with 1:1 and 1:3 Octave Band Filters. The instrument was calibrated *in situ* at 94 dB prior to and after use using a Cirrus CRL 513A acoustic calibrator. Factory calibration certificates for the noise level meter and the acoustic calibrator, detailing equipment serial numbers, calibration traceability and re-calibration dates are presented in Appendix II of this report. The sound level meter was orientated towards the noise source, mounted on an outdoor microphone stand which in turn was mounted on a tripod at 1.5m above ground level. This instrument is a Type 1 instrument in accordance with IEC 651 regulations. The Time Weighting used was Fast and the Frequency Weighting was A-weighted as per IEC 651.

3.3 Survey implementation

TMS Environment Ltd. personnel conducted this survey on 3rd June 2004. The measurement parameters included meteorological observations of prevailing conditions at the time of the survey. All sources of noise were noted, recorded and where possible, identified. The primary measurement parameter was the equivalent continuous A-Weighted Sound Pressure Level, $L_{Aeq, T}$, over 30 minute measurement intervals for the duration of the day time survey. A statistical analysis of the measurement results was also completed so that the percentile levels, $L_{AN, T}$, for $N = 90\%$ and 10% over 30-minute measurement intervals were also recorded. The percentile levels represent the noise level in dB(A) exceeded for $N\%$ of the measurement time. In addition, a 1/3 octave band frequency analysis was conducted at each noise monitoring position to determine the presence of any tonal component of noise generated at the site. A graphical representation of the frequency analysis is presented in Appendix I. All sources of noise were noted, recorded and where possible, identified for the frequency analysis.

4.0 Survey results

The measurement results for the noise survey are reported in Table 2. The measurement results for the 1/3 octave band frequency analysis survey are presented in Appendix I.

Table 1 Monitoring point locations for noise survey

MONITORING LOCATION	DESCRIPTION
N1	TO THE LEFT OF THE SITE ENTRANCE GATE ALONG THE NORTHERN BOUNDARY, IN FRONT OF THE OFFICES
N2	ALONG THE WESTERN BOUNDARY AT BACK CORNER OF SITE
N3	AT THE EASTERN BOUNDARY WALL BETWEEN AN OFFICES BUILDING AND OPEN SHED AREA
N4	AT THE NORTHERN BOUNDARY WALL TOWARDS THE CORNER OF THE SITE
NSR1	NEAREST NOISE SENSITIVE RECEPTOR LOCATED OUTSIDE THE NORTHERN BOUNDARY OF THE SITE ADJACENT TO SALON SERVICES HAIR & BEAUTY WORLD

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Table 2 Daytime environmental noise survey, Oxigen Environmental Ltd Robinhood Road, Dublin 22.

MONITORING LOCATION	SURVEY TIME INTERVAL	L _{Aeq, 30min} dB(A)	L _{A90, 30min} dB(A)	L _{A10, 30min} dB(A)	SOURCES OF NOISE
N1	14:03 to 14:33 03-06-2004	65	63	66	Continuous noise from generator at 10m proximity; Traffic on adjacent Robinhood Rd; Minor construction activities on site – teleporter in use, 2 nd generator in use at opposite side of site, hamming/banging.
N2	14:40 to 15:10 03-06-2004	64	54	65	Continuous background noise from generators on site; Intermittent use of angle grinder and welding activities; Traffic on Robinhood Road.
N3	15:16 to 15:46 03-06-2004	61	59	64	Continuous background noise from generators on site; Intermittent use of angle grinder and welding activities; Traffic on Robinhood Road.
N4	16:01 to 16:31 03-06-2004	63	60	64	Minor construction activities on site – grinding and welding activities, teleporter in use, continuous background noise from generators on site; Traffic on Robinhood Road.
NSR1	12:40 to 13:10 03-06-2004	68	59	74	Predominant noise source from passing road traffic, traffic very busy and queuing along Robinhood Rd. Noise from activities at Oxigen audible but masked.

NOTE: [1] Observed weather conditions during day-time monitoring were as follows; 03/06/2004: Warm with high humidity, occasional light rain, Southwesterly wind of velocity 1-5 m/s.
 [2] Noise monitoring locations are as shown in Figure 1

5.0 Evaluation of Results

On this occasion normal site activities were not occurring; the various item of plant were not in operation and no trucks were delivering or taking away waste from the site. The most significant site-generated noise was that related to minor maintenance activities on site including welding, angle grinding, hammering, use of a teleporter for moving equipment, and two power generators were running throughout the survey. The activities on site are intermittent and small scale in nature (only 2 to 3 workmen at any given time) apart from the continuous operation of the generators.

The dominant sources of off-site noise were from passing roadside traffic along the Robinhood Road and background noise from other commercial units in the area. This off-site noise dominated the noise climate in the area. The road outside the site has a constant volume of traffic with a high percentage of Heavy Goods Vehicles (HGV's) driving to or from the associated businesses in the local vicinity of Oxigen Environmental Ltd.

The Waste Licence Reg. No. 152-1, Schedule C.1 states a Noise Emission Limit of $L_{Aeq, 30min} = 55dB(A)$. This limit was exceeded at all five monitoring locations N1 to N4 and NSR1.

The results presented in Table 2 indicate that while operations at the site contribute to the noise climate in the area, road traffic associated with other local businesses in the area exerts a major influence on the local noise climate.

$L_{Aeq, 30min}$ measurement values recorded at all points are dominated by road traffic on the Robinhood Road, with lesser noise contributions from site activities at the Oxigen waste facility.

The corresponding L_{A90} values (which are representative of background noise levels) recorded at the noise monitoring locations range from 54dB(A) to 63 dB(A) $L_{A90,30 mins}$. This indicates that the noise climate of the area is influenced by a number of dominant off-site and on-site noise sources. The background noise levels at all noise monitoring locations N-1; N-2 and N-4 are consistent with the expected results considering the high volume of traffic and commercial noise in the vicinity of the site. The major source of continuous noise on site are the two generators which were running throughout the survey. The teleporter, when not in operation was left idling for significant intervals throughout the survey thus increasing background noise levels.

The corresponding L_{A10} values (which are representative of intermittent, high energy noise levels) recorded indicates that there are significant sources of both on site and off-site noise, the majority of which is attributable to site and road traffic. The L_{A10} values recorded range from 64dB(A) to 74dB(A) $L_{A10, 30 min}$, which is consistent with the expected result considering the proximity of the site and noise monitoring locations to noise sources and roadside traffic. Intermittent, high - energy noise on site was generated by the short - term welding and angle grinding activities.

Analysis of the octave band frequency spectra measured at each of the noise locations as presented in Appendix I, shows that the dominant frequency bands are towards the

lower end of the frequency spectrum for all 5 measurement locations. This implies that noise generated at the site is primarily comprised of lower pitched sounds which are generally less annoying to most people. In general, no one third octave band should exceed adjacent bands by more than 5 dB in order to ensure that there is no tonal component associated with noise generating activities. From this study it is shown that at locations N-1, N2, N3 and NSR 1, each frequency spectrum contains an octave band at 40Hz which exceeds adjacent bands by 5 dB. Tonal bands are also present (to a lesser degree) at 80Hz and 50Hz for N2 and N4 respectively. These low frequency tones may be directly attributed to the operation of generators on site, the idling teleporter and slow moving traffic on the adjacent Robinhood road.

Tonal components are present during the course of this survey primarily due to the fact that with minimal activity on site the individual noise sources become more evident at their particular frequency. When the plant is in full operation a broader range of frequency noise will be present thus producing a fuller or more balanced spectrum. It must be noted however, as these frequency bands are in the lower end of the frequency spectrum it is unlikely that they would cause noise nuisance.

6.0 Conclusions

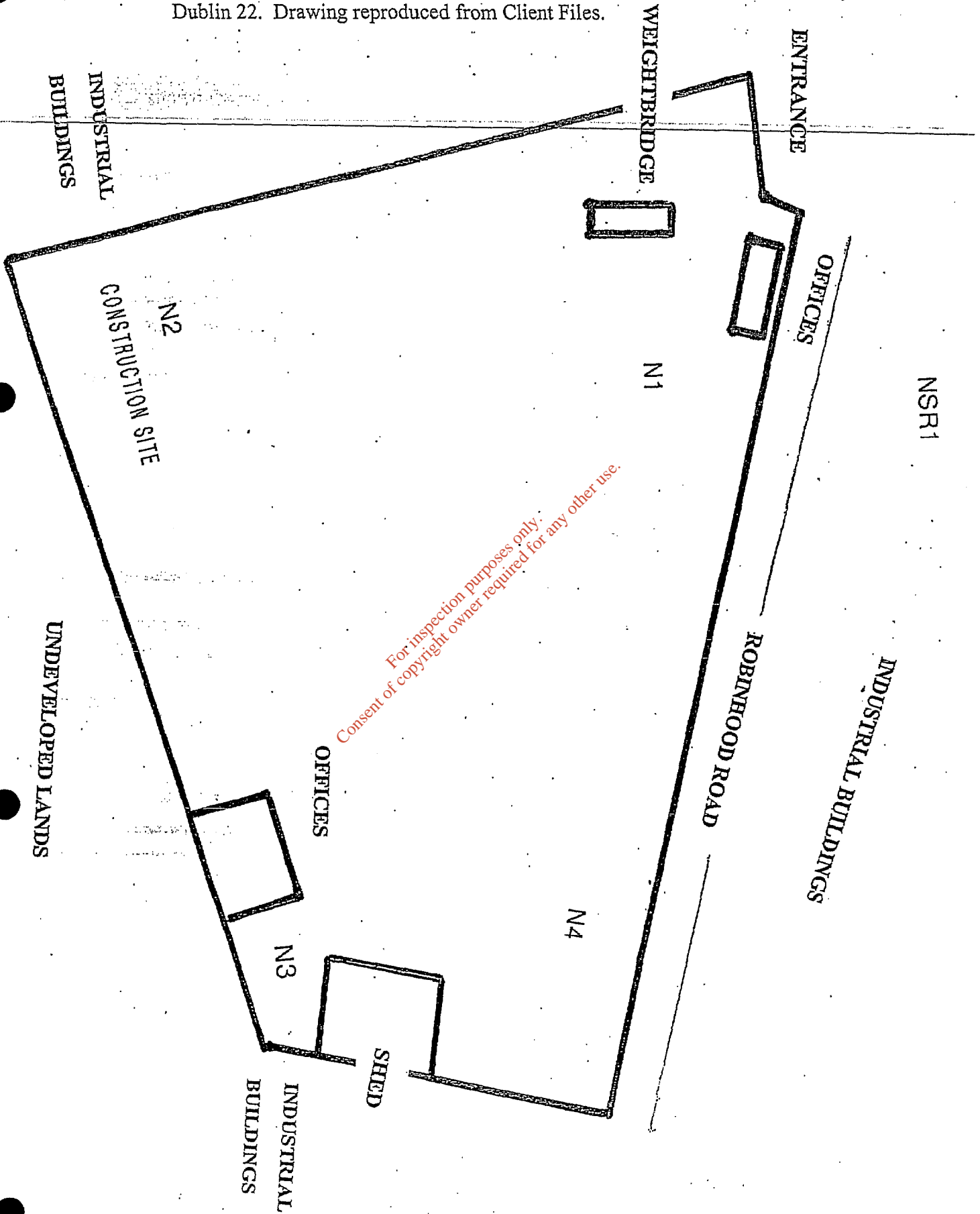
As stated earlier, on this occasion normal site activities were not in operation and the site-generated noise was that related to minor maintenance activities including welding, angle grinding, hammering and the use of a teleporter. Traffic noise associated with other businesses in the area and general traffic using Robinhood Road is the major contributor to the noise climate in the area. Since the site is located on the side of a busy road in an urban industrial setting, it is not expected that complaints of noise nuisance will occur as a result of site activities.

7.0 Recommendations

In order to reduce the noise levels generated by site activities it is recommended that vehicle engines and items of plant should be turned off when not in use. Unnecessary engine idling and machinery operation and speed should be kept to a minimum. It is suggested that all drivers and machinery operators be informed of the importance of minimising noise climate impacts and be encouraged to uphold recommendations.

Figure 1

Noise measurement positions at Oxigen Environmental Ltd Robinhood Road, Dublin 22. Drawing reproduced from Client Files.



APPENDIX I

1/3 OCTAVE BAND FREQUENCY ANALYSIS RESULTS AND GRAPHS

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Noise Measurement Report

Serial No.: B16017FF Recal Due: 30/04/06

Date: 03/06/04 Time: 13:58:49

Cal. to 93.7 dB
Offset -0.2 dB

Notes: 7299 Start Calibration

Printed: 08/06/04 14:40:06

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Noise Measurement Report

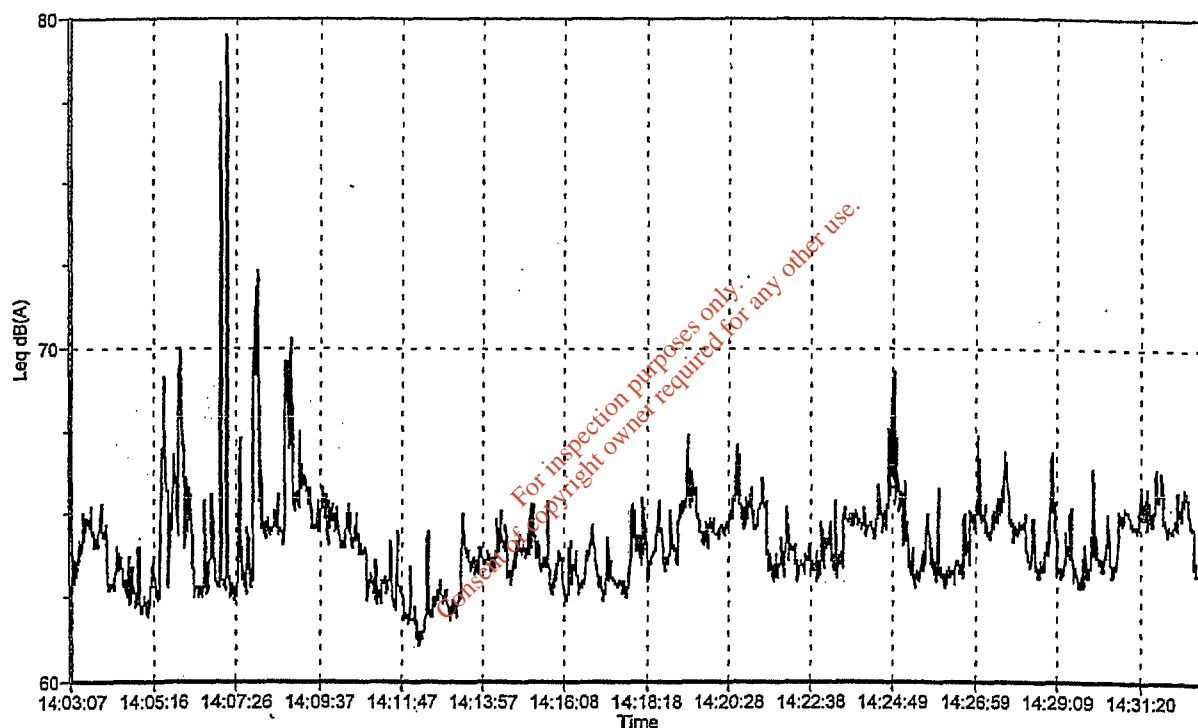
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 14:03:07

Run Time: 00:30:00
Range: 40-100 dB

Leq 64.6 dBA
Lepd 52.5 dBA
LAE 96.9 dBA
LAFmax 83.2 dBA
Peak 100.6 dBC

L1.0	L10.0	L50.0	L90.0	L95.0	L99.0
68.9 dBA	65.7 dBA	64.3 dBA	63.0 dBA	62.6 dBA	62.0 dBA



Notes: 7299 Oxygen Environmental, Ballymount - N-1

Printed: 08/06/04 14:39:49

Noise Measurement Report

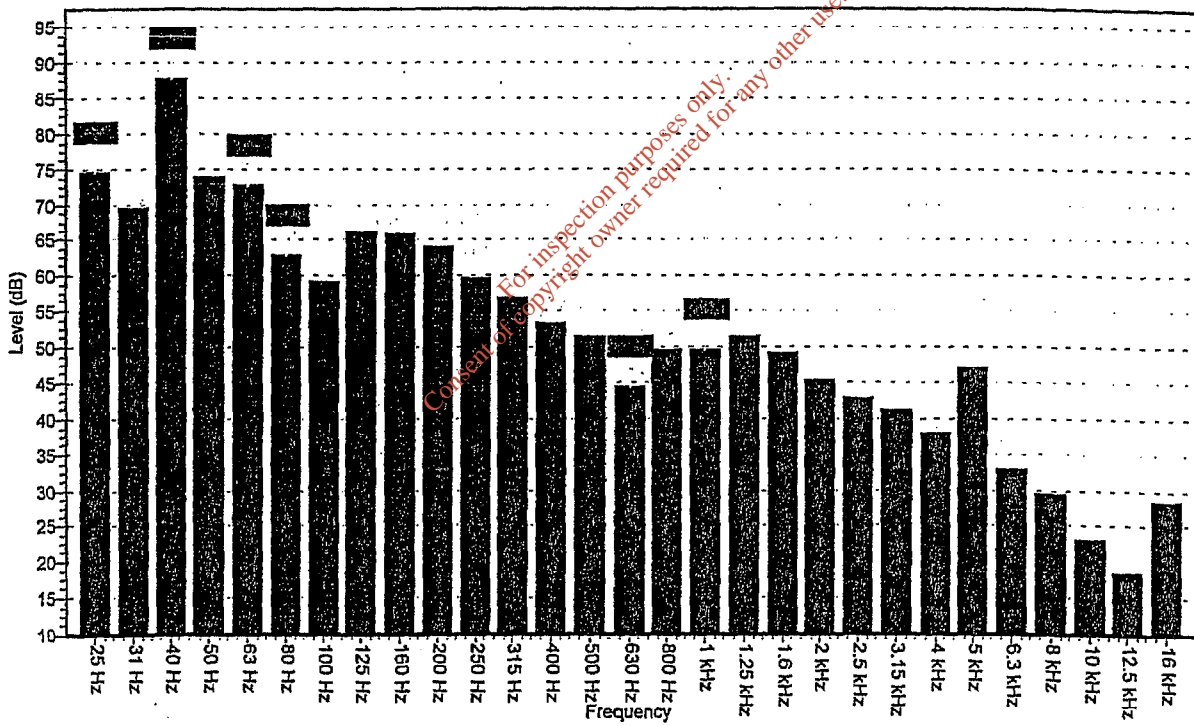
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 14:35:38

Run Time: 00:02:40
 Range: 40-100 dB
 Spectrum 'Z' weighted

Measurement	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz
Level (dB)	74.4 [^]	69.4	87.8 [^]	73.8	72.7 [^]	62.7 [^]	59.2	66.0	65.7	63.9	59.6
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz
Level (dB)	56.8	53.3	51.3	44.3 [^]	49.7	49.6 [^]	51.4	49.0	45.1	42.6	41.0
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	LAeq	LCeq	LZeq	
Level (dB)	38.0	47.0	32.8	29.5	23.0	18.5	28.2	63.2	87.4	87.4	
Duration (s)	5	5	5	5	5	5	5	5	5	5	

[^] indicates overload



Notes: 7299 Oxygen Environmental, Ballymount - N-1

Printed: 08/06/04 14:39:13

Noise Measurement Report

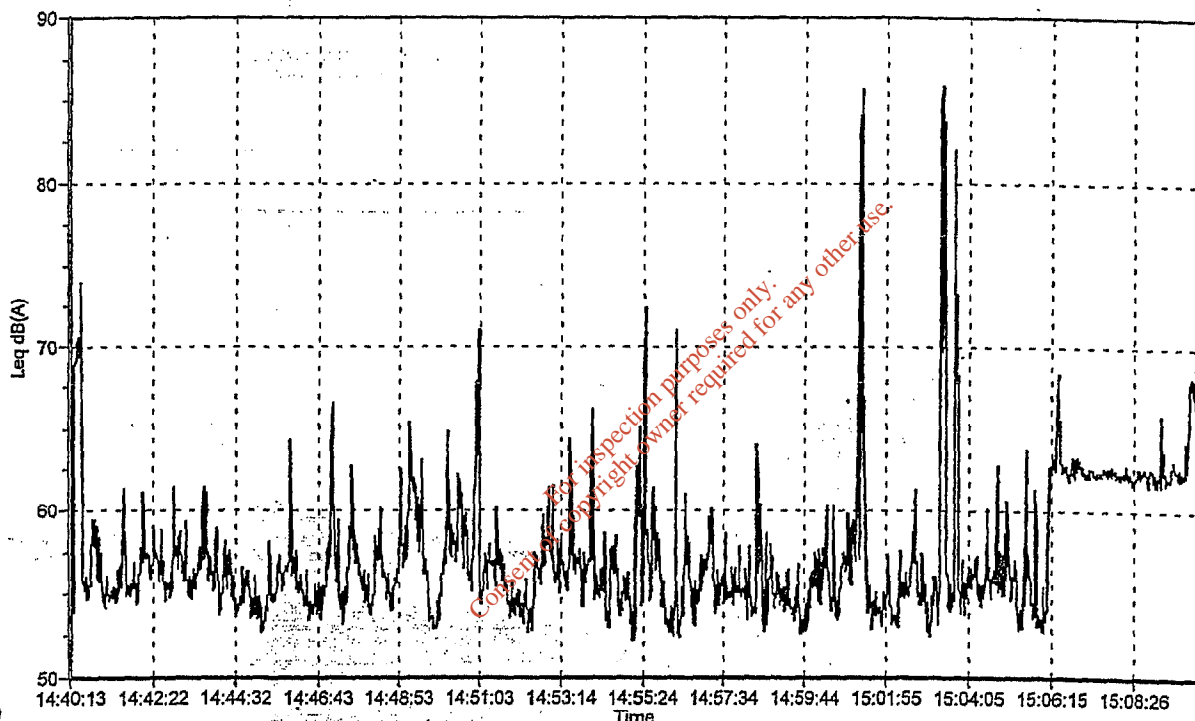
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 14:40:13

Run Time: 00:30:00
Range: 40-100 dB

Leq 64.0 dBA
Lepd 52.0 dBA
LAE 96.3 dBA
LAFmax 91.3 dBA
Peak 104.3 dBC

L1.0	L10.0	L50.0	L90.0	L95.0	L99.0
150.0 dBA	64.7 dBA	56.7 dBA	54.2 dBA	53.7 dBA	53.1 dBA



Notes: 7299 Oxygen Environmental, Ballymount - N2

Printed: 08/06/04 14:38:37

Noise Measurement Report

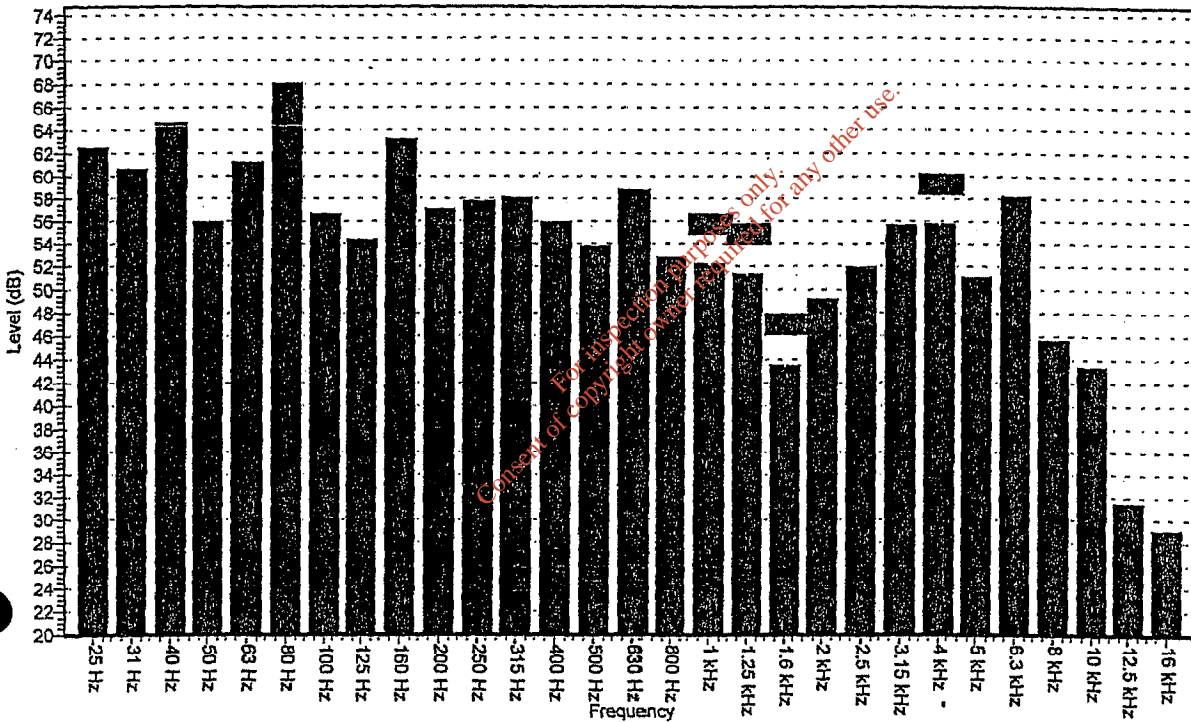
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 15:11:33

Run Time: 00:02:40
 Range: 40-100 dB
 Spectrum 'Z' weighted

Measurement	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz
Level (dB)	62.5	60.6	64.5	55.9	61.2	68.0	56.6	54.3	63.1	57.0	57.7
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz
Level (dB)	58.0	55.9	53.8	58.7	52.8	52.2 [^]	51.3 [^]	43.4 [^]	49.2	51.9	55.6
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	LAeq	LCeq	LZeq	
Level (dB)	55.7 [^]	51.0	58.1	45.6	43.2	31.5	29.0	65.6	72.5	80.3	
Duration (s)	5	5	5	5	5	5	5	5	5	5	

[^] indicates overload



Notes: 7299 Oxygen Environmental, Ballymount - N2

Printed: 08/06/04 14:38:02

Noise Measurement Report

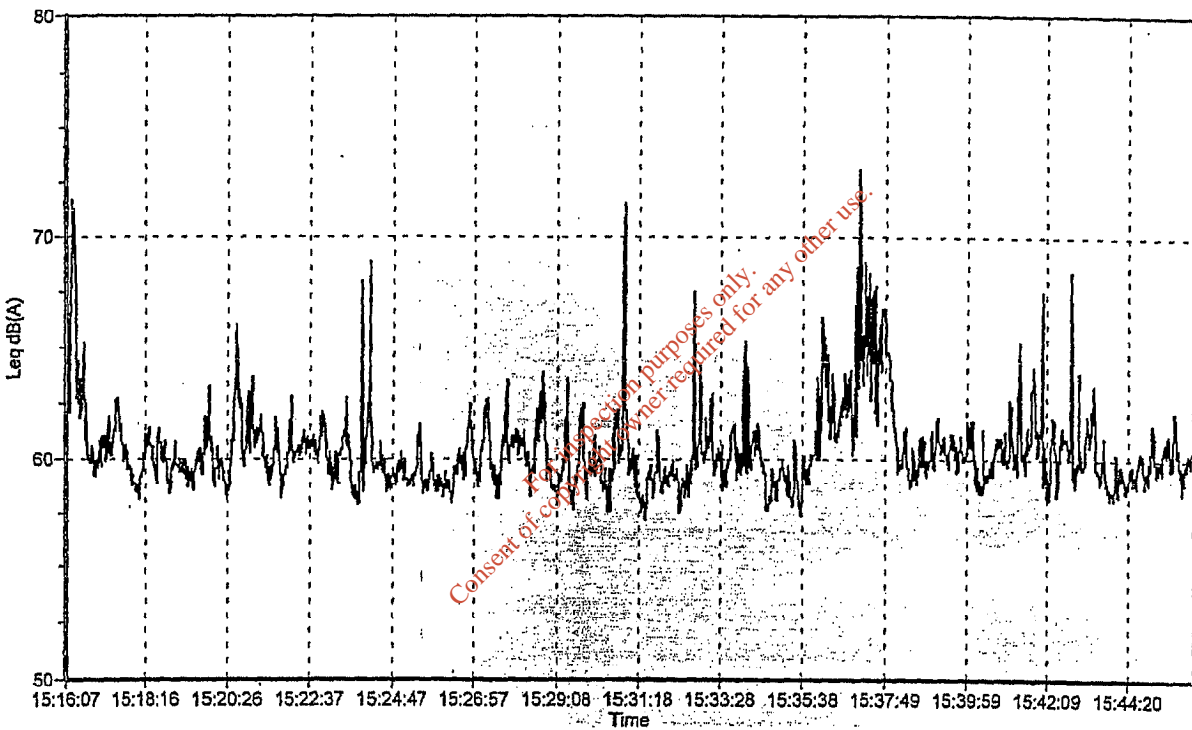
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 15:16:07

Run Time: 00:30:00
Range: 40-100 dB

Leq 61.0 dBA
Lepd 48.9 dBA
LAE 93.3 dBA
LAFmax 77.7 dBA
Peak 96.3 dBC

L1.0 L10.0 L50.0 L90.0 L95.0 L99.0
150.0 dBA 64.2 dBA 60.4 dBA 58.9 dBA 58.6 dBA 57.9 dBA



Notes: 7299 Oxygen Environmental, Ballymount - N3

Printed: 08/06/04 14:37:33

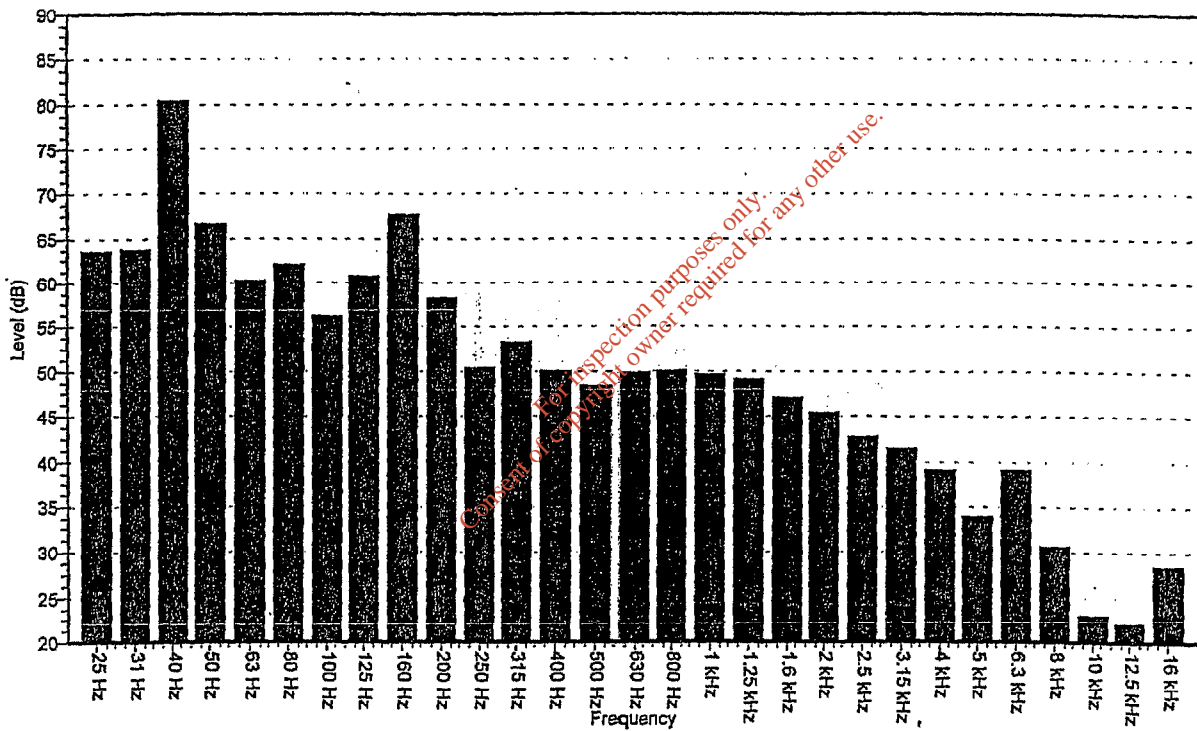
Noise Measurement Report

Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 15:54:47

Run Time: 00:02:40
 Range: 40-100 dB
 Spectrum 'Z' weighted

Measurement	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz
Level (dB)	63.4	63.7	80.4	66.6	60.2	62.1	56.3	60.8	67.8	58.3	50.4
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz
Level (dB)	53.3	49.9	48.4	49.8	49.9	49.6	49.0	47.1	45.4	42.7	41.4
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	LAeq	LCeq	LZeq	
Level (dB)	39.1	33.9	39.0	30.5	23.0	22.0	28.5	62.7	79.8	83.5	
Duration (s)	5	5	5	5	5	5	5	5	5	5	



Notes: 7299 Oxygen Environmental, Ballymount - N3

Printed: 08/06/04 14:37:10

Noise Measurement Report

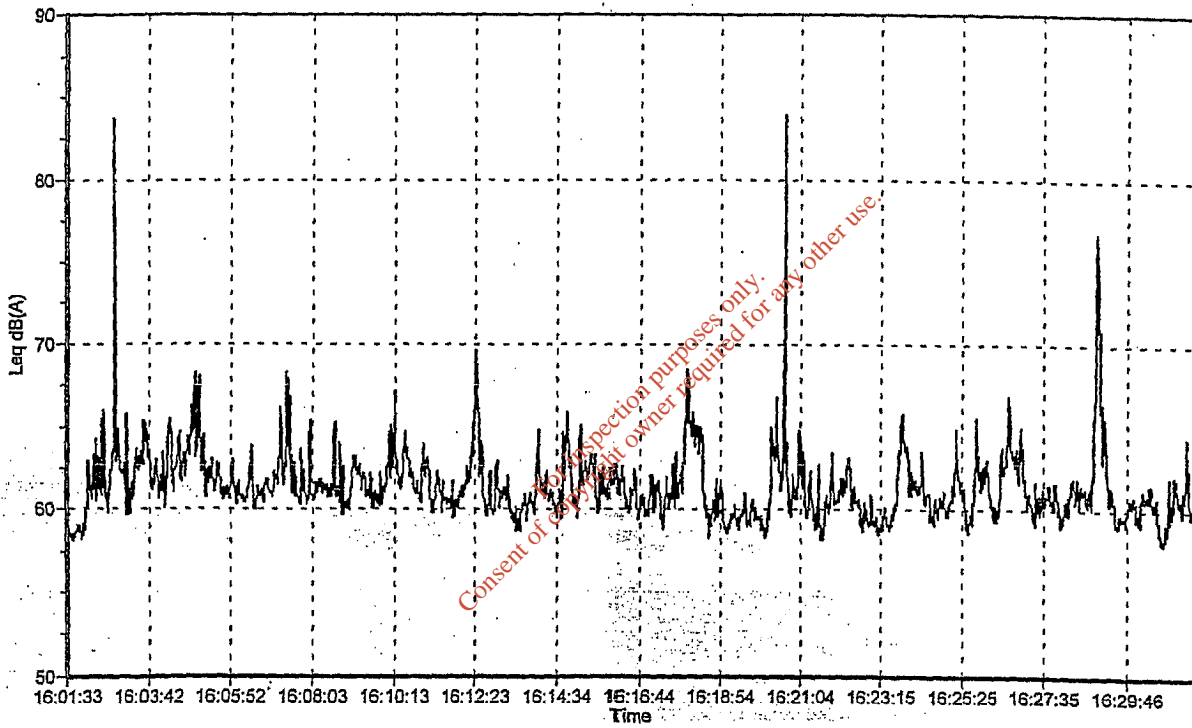
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 16:01:33

Run Time: 00:30:00
Range: 40-100 dB

Leq 62.8 dBA
Lepd 50.8 dBA
LAE 95.2 dBA
LAFmax 88.6 dBA
Peak 102.6 dBC

L1.0	L10.0	L50.0	L90.0	L95.0	L99.0
68.1 dBA	64.0 dBA	61.3 dBA	59.8 dBA	59.3 dBA	58.8 dBA



Notes: 7299 Oxygen Environmental, Ballymount - N-4

Printed: 08/06/04 14:36:28

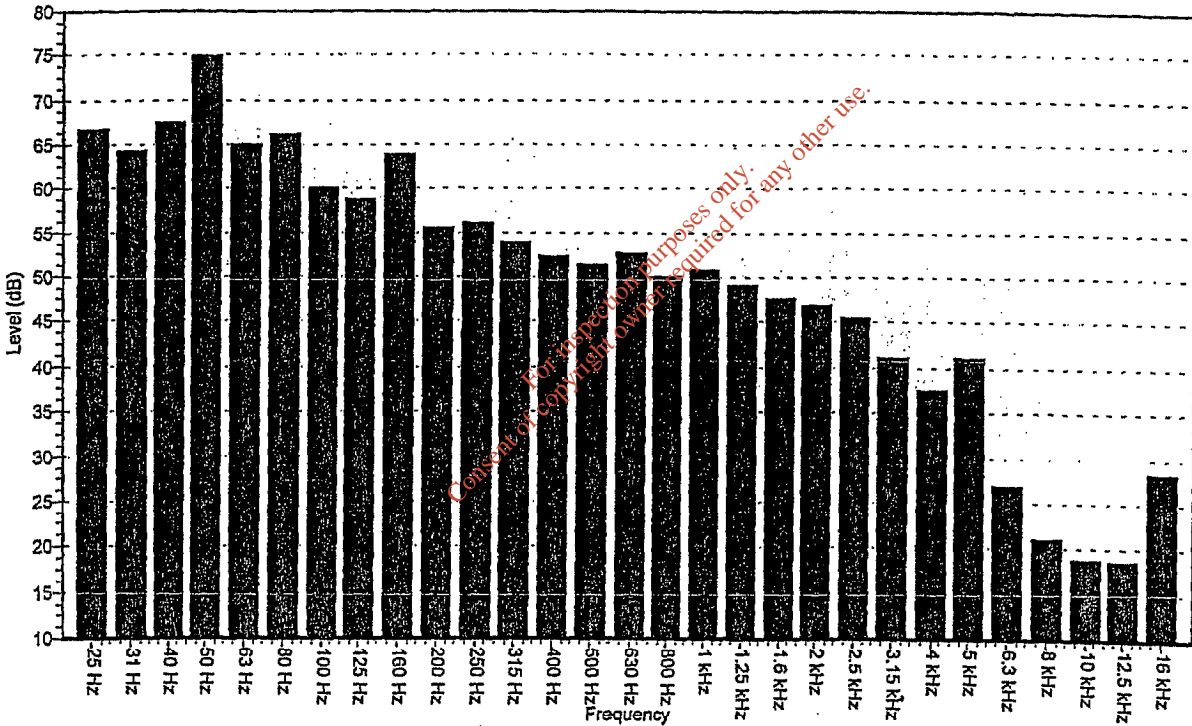
Noise Measurement Report

Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 16:32:29

Run Time: 00:02:40
 Range: 40-100 dB
 Spectrum: 'Z' weighted

Measurement	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz
Level (dB)	66.7	64.3	67.4	74.9	65.0	66.1	60.0	58.8	63.9	55.5	56.1
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz
Level (dB)	53.9	52.2	51.2	52.7	50.1	50.8	49.2	47.7	46.9	45.4	41.2
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	LAeq	LCeq	LZeq	
Level (dB)	37.5	41.2	26.8	20.9	18.8	18.7	28.4	60.0	77.7	80.3	
Duration (s)	5	5	5	5	5	5	5	5	5	5	



Notes: 7299 Oxygen Environmental, Ballymount - N4

Printed: 08/06/04 14:36:05

Noise Measurement Report

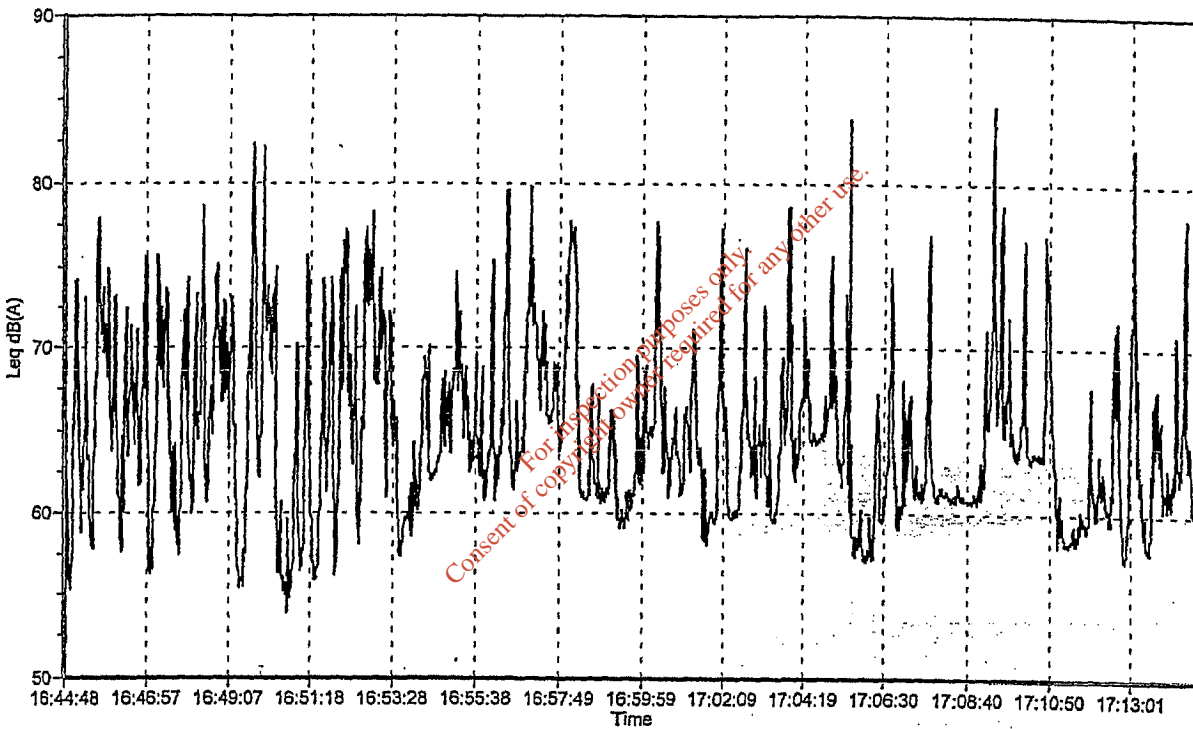
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 16:44:48

Run Time: 00:30:00
Range: 40-100 dB

Leq 68.4^dBA
Lepd 56.4^dBA
LAE 100.7 dBA
LAFmax 89.1^dBA
Peak 104.5^dBC

L1.0 L10.0 L50.0 L90.0 L95.0 L99.0
150.0^dBA 74.1^dBA 64.3^dBA 59.1^dBA 57.9^dBA 55.8^dBA



Notes: 7299 Oxygen Environmental, Ballymount - NSR-1

Printed: 08/06/04 14:35:35

Noise Measurement Report

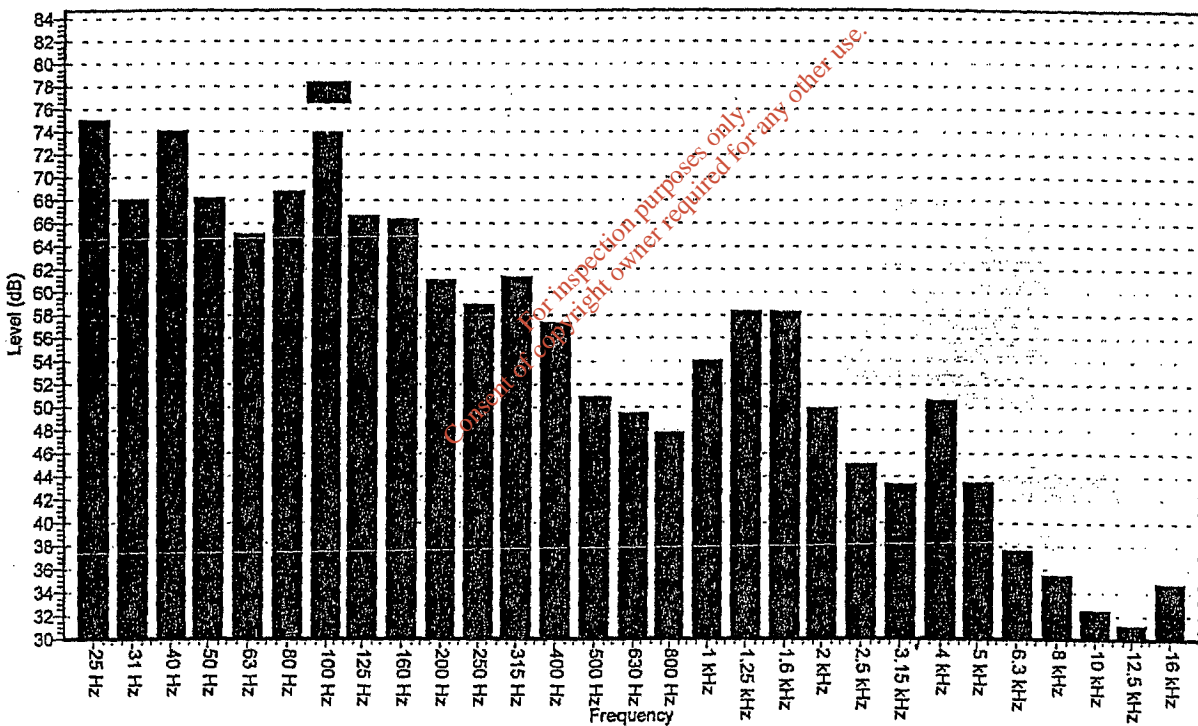
Serial No.: B16017FF Recal Due: 30/04/05

Date: 03/06/04 Time: 17:15:49

Run Time: 00:02:40
 Range: 40-100 dB
 Spectrum: 'Z' weighted

Measurement Level (dB)	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz
	75.0	68.0	74.0	68.2	65.1	68.8	73.9 [^]	66.6	66.3	61.0	58.9
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement Level (dB)	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz
	61.4	57.3	50.8	49.4	47.7	54.0	58.3	58.4	49.9	45.0	43.3
Duration (s)	5	5	5	5	5	5	5	5	5	5	5
Measurement Level (dB)	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	LAeq	LCeq	LZeq	
	50.5	43.4	37.6	35.4	32.4	31.2	34.7	70.5	77.3	79.8	
Duration (s)	5	5	5	5	5	5	5	5	5	5	

[^] indicates overload



Notes: 7299 Oxygen Environmental, Ballymount - NSR-1

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APPENDIX II

CALIBRATION CERTIFICATES FOR

**CR:831A SOUND LEVEL METER.
CR:513A ACOUSTIC CALIBRATOR**

*For inspection purposes only.
Consent of copyright owner required for any other use.*

Certificate of Calibration



Equipment Details

Instrument Manufacturer	Cirrus Research plc
Instrument Type	Acoustic Calibrator
Model Number	CR-513A
Serial Number	033737

Calibration Procedure

The acoustic calibrator detailed above has been calibrated to the published data as described in the operating manual. The procedures and techniques used to follow the recommendations of IEC standard Electroacoustics - Sound Calibrators IEC 60942:1997 and BS EN 60942:1998. The calibrator's main output is 94.00 dB (1 Pa) and this was set within the 0.01 dB resolution of the test system, i.e. one hundredth of a decibel. Numbers in {parenthesis} refer to the paragraph in IEC 60942.

Calibration Traceability

The calibrator above was calibrated against the calibration laboratory standards held at Hunmanby UK YO14 0PH. These are traceable to UK national standards {A.0.6}. The standards are:

Microphone Type	B&K4180	Serial Number	1893453	Calibration Ref.	S 5008
Pistonphone Type	B&K4220	Serial Number	613843	Calibration Ref.	S 5009

Calibration Climatic Conditions

These climatic test conditions were all maintained within the permitted limits of IEC 60942:1997.

Temperature	{B.3.2}	Permitted band	15°C to 25°C
Humidity	{B.3.2}	Permitted band	30% to 90% RH
Static Pressure	{B.3.2}	Permitted band	85 kPa to 105 kPa
Ambient Noise Level	{B.3.3.6}	Max permitted level	64 dB(Z)

Measurement Results

The figures below are the Calibration Laboratory test limits for this model calibrator and have a smaller tolerance than those permitted in IEC 60942.

94 dB Output	93.98	dB	Permitted band	93.95 to 94.05 dB
104 dB Output	104.02	dB	Permitted band	103.80 to 104.30 dB
Frequency	1004.0	Hz	Permitted band	990 Hz to 1010 Hz

Uncertainty

With an uncertainty coefficient $k=2$, i.e. a 95% confidence level, the uncertainty of each measurement is:

94 dB Output	± 0.13 dB	104 dB Output	± 0.14 dB
Frequency	± 0.1 Hz	Level Stability	± 0.04 dB

Calibrated By

Calibration Date

21 April 2004

Calibration Certificate Number

126855

This Calibration Certificate is valid for 12 months from the date above.

Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH
Telephone 01723 891655 Fax 01723 891742

Certificate of Calibration



Equipment Details

Instrument Manufacturer	Cirrus Research plc
Instrument Type	Sound Level Meter
Model Number	CR:831A
Serial Number	B16017FF

Calibration Procedure

The instrument detailed above has been calibrated to the published test and calibration data as detailed in the instrument handbook, using the techniques recommended in the latest revisions of the International Standards IEC 61672-1:2002, IEC 60651:1979, IEC 60804:2001, IEC 61260:1995, IEC 60942:1997, IEC 61252:1993, ANSI S1.4-1983 and ANSI S1.43-1997 where applicable.

Sound Level Meters: All Calibration procedures were carried out by substituting the microphone capsule with a suitable electrical signal, apart from the final acoustic calibration.

Calibration Traceability

The equipment detailed above was calibrated against the calibration laboratory standards held by Cirrus Research plc. which are traceable to the appropriate National Standards.

The Cirrus Research plc calibration laboratory standards are:

Microphone Type	B&K4180	Serial Number	1893453	Calibration Ref.	S 5008
Pistonphone Type	B&K4220	Serial Number	613843	Calibration Ref.	S 5009

Calibrated By

Calibration Date

21 April 2004

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