Acoustics Technical Note

To	Ian Roach	**From**	Alf Maneylaws
Copies to	File	**Date**	30/3/11
Subject	D123356: Devonport EfW: Analysis of measurement data to support adopted approach to BS4142 assessment.		

Introduction

This technical note provides an analysis of measured noise level data for a comparable EfW plant to that proposed at Devonport. The purpose of the analysis is to demonstrate that there are no distinctive features present in the emitted noise (e.g. a tonal component, distinct impulses or irregularity) and consequently the + 5 dB(A) correction, as defined in BS4142, is not required for the night-time period.

The daytime period is rather different as there is a significant amount of HGV traffic, indicating that the emitted noise may be considered irregular enough to attract attention. In this case, the + 5 dB(A) correction may be applicable.

British Standard BS4142

British Standard BS4142:1997 'Method for Rating Industrial Noise Affecting Mixed residential and Industrial Areas' provides a method for assessing whether noise from industrial premises (or industrial type noise from commercial premises) is likely to give rise to complaints from people resident in properties in the locality

The standard defines a Rating Level, which is equal to the specific noise level of the industrial source at the sensitive receptor (as calculated) plus the addition of a 5 dB(A) correction where necessary.

Paragraph 8.2 of BS4142 states;-

> *Apply a 5 dB correction if one or more of the following features occur, or are expected to be present for new or modified noise sources:*
>
> - *the noise contains a distinguishable, discrete, continuous note (whine, hiss, screech, hum etc.)*
> - *the noise contains distinct impulses (bangs, clicks, clatters or thumps)*
> - *the noise is irregular enough to attract attention*
>
> *Note: The Rating Level is equal to the specific noise level if there are no such features present or expected to be present.*

BS4142 treats the daytime (07:00 to 23;00) and night-time (23:00 to 07:00) periods separately.

British Standard BS7445-2

British Standard BS7445-2: 1991 'Description and Measurement of Environmental Noise. Part 2: Guide to the Acquisition of Data Pertinent to Land Use' describes methods to be used for measuring and describing environmental noise relevant to general land use.

Section 4.1.3 deals with tone adjustment and the supplementary note to that section states;-

> *In some practical cases, a prominent tonal component may be detected in one-third octave spectra if the level of a one-third octave band exceeds the level of the adjacent bands by 5 dB or more, but a narrow-band frequency analysis may be required in order to detect precisely the occurrence of one or more tonal components in a noise signal. If tonal components are clearly audible and their presence can be detected by a one-third octave analysis, the adjustment may be 5 to 6 dB. If the components are only just detectable by the observer and demonstrated by narrow-band analysis, an adjustment of 2 to 3 dB may be appropriate.*

This indicates that, if tonal components are **clearly audible** (e.g. the whine, hiss, screech, hum etc. mentioned above), and their presence can be detected by a one third octave band analysis, the adjustment may be 5 to 6 dB.

Measured Noise Level Data

The comparable plant is located in Mannheim in Germany. The original supporting information and data for this Mannheim plant is provided with this note as Appendix 1.

The data as supplied were A-Weighted third octave bands sound pressure levels at two receptor locations. The data were supported by subjective evidence that the noise character did not have any tonal features (e.g. whine, hiss, screech, hum etc.) and that there were no impulsive or irregularity features.

The supplied data were processed to provide Linear third octave bands sound pressure levels.

For both the A-Weighted and Linear third octave band levels, a simple analysis was carried out to identify any third octave bands where the level was greater than the levels in the adjacent third octave bands. The results are provided in Table 1, where the identified bands are highlighted.

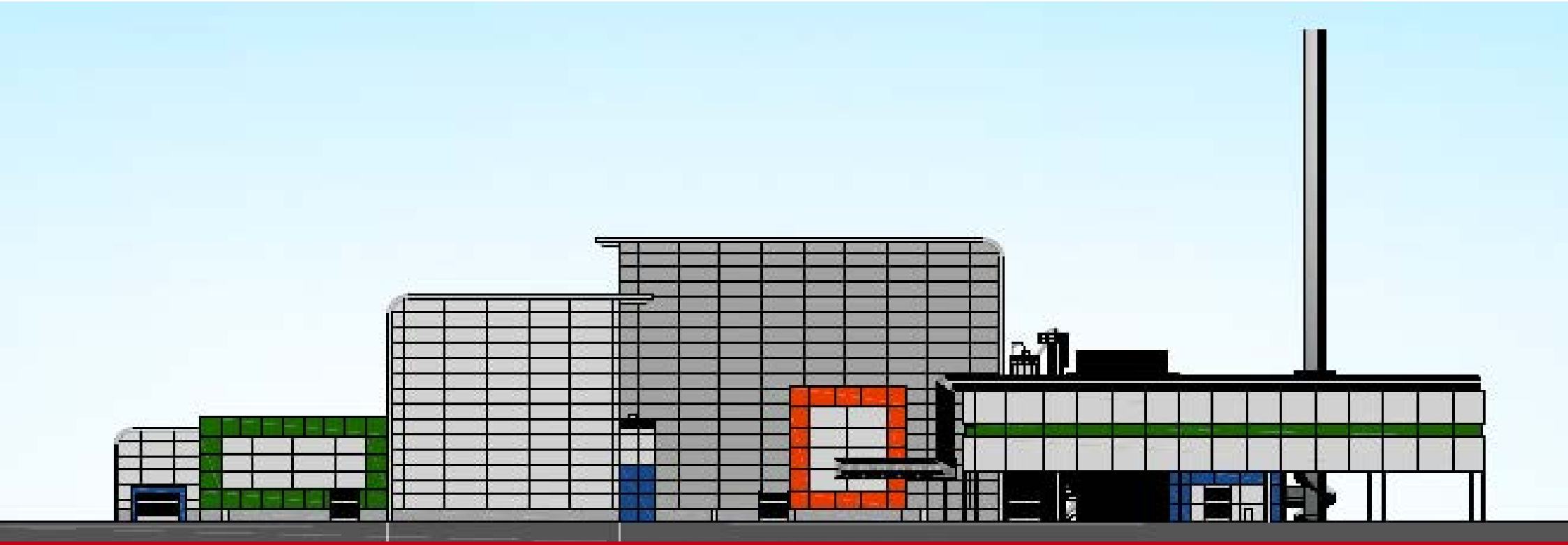
Inspection of Table 1 shows that, whilst there are several bands which meet this criterion, the difference between the band levels is significantly less than 5 dB. **It is concluded that a tonal adjustment is not required for the night-time period.** This conclusion is supported by the subjective evidence and the generally “broad band” nature of the noise from the Mannheim plant, which would mask any minor tonal components (particularly at the lower frequencies where the third octave band levels are at or below the level of perception.

Table 1: Analysis of Supplied Measurement Data

LOCATION IO1: MEASURED THIRD OCTAVE BAND NOISE LEVELS																																
		16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 k	1.25 k	1.6 k	2.0 k	2.5 k	3.15 k	4.0 k	5.0 k	6.3 k	8.0 k	10.0 k	12.5 k
A-WT	IO1 MEAS 1	3	4	8	8	12	20	22	24	27	30	30	33	34	36	36	36	37	38	38	36	34	32	30	26	20	16	12	10	8	6
A-WT	IO1 MEAS 2	0	3	9	8	12	18	22	24	27	30	32	33	34	37	36	36	36	37	38	36	34	32	30	26	19	12	8	7	6	4
A-WT	IO1 MEAS 3	0	3	8	8	12	18	22	24	27	30	30	32	34	37	36	36	38	38	38	36	34	32	30	26	19	16	14	12	8	6
	A-WT	-56.7	-50.5	-44.7	-39.4	-34.6	-30.2	-26.2	-22.5	-19.1	-16.1	-13.4	-10.9	-8.6	-6.6	-4.8	-3.2	-1.9	-0.8	0	0.6	1	1.2	1.3	1.2	1	0.5	-0.1	-1.1	-2.5	-4.3
LINEAR	IO1 MEAS 1	59.7	54.5	52.7	47.4	46.6	50.2	48.2	46.5	46.1	46.1	43.4	43.9	42.6	42.6	40.8	39.2	38.9	38.8	38	35.4	33	30.8	28.7	24.8	19	15.5	12.1	11.1	10.5	10.3
LINEAR	IO1 MEAS 2	56.7	53.5	53.7	47.4	46.6	48.2	48.2	46.5	46.1	46.1	45.4	43.9	42.6	43.6	40.8	39.2	37.9	37.8	38	35.4	33	30.8	28.7	24.8	18	11.5	8.1	8.1	8.5	8.3
LINEAR	IO1 MEAS 3	56.7	53.5	52.7	47.4	46.6	48.2	48.2	46.5	46.1	46.1	43.4	42.9	42.6	43.6	40.8	39.2	39.9	38.8	38	35.4	33	30.8	28.7	24.8	18	15.5	14.1	13.1	10.5	10.3

LOCATION IO2: MEASURED THIRD OCTAVE BAND NOISE LEVELS																																
		16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 k	1.25 k	1.6 k	2.0 k	2.5 k	3.15 k	4.0 k	5.0 k	6.3 k	8.0 k	10.0 k	12.5 k
A-WT	IO2 MEAS 1	1	5	12	10	15	16	18	22	24	28	30	33	34	35	36	36	37	37	38	36	35	33	30	24	20	14	10	7	6	4
A-WT	IO2 MEAS 2	4	6	12	13	15	17	19	23	24	27	31	33	34	35	36	36	36	36	36	34	32	31	30	24	20	14	10	7	6	4
	A-WT	-56.7	-50.5	-44.7	-39.4	-34.6	-30.2	-26.2	-22.5	-19.1	-16.1	-13.4	-10.9	-8.6	-6.6	-4.8	-3.2	-1.9	-0.8	0	0.6	1	1.2	1.3	1.2	1	0.5	-0.1	-1.1	-2.5	-4.3
LINEAR	IO2 MEAS 1	57.7	55.5	56.7	49.4	49.6	46.2	44.2	44.5	43.1	44.1	43.4	43.9	42.6	41.6	40.8	39.2	38.9	37.8	38	35.4	34	31.8	28.7	22.8	19	13.5	10.1	8.1	8.5	8.3
LINEAR	IO2 MEAS 2	60.7	56.5	56.7	52.4	49.6	47.2	45.2	45.5	43.1	43.1	44.4	43.9	42.6	41.6	40.8	39.2	37.9	36.8	36	33.4	31	29.8	28.7	22.8	19	13.5	10.1	8.1	8.5	8.3

Appendix 1: Supporting information and Data for Mannheim EfW Plant



SWDWP PFI Project
Noise Monitoring Report of the Facility in Mannheim

30st of March 2011

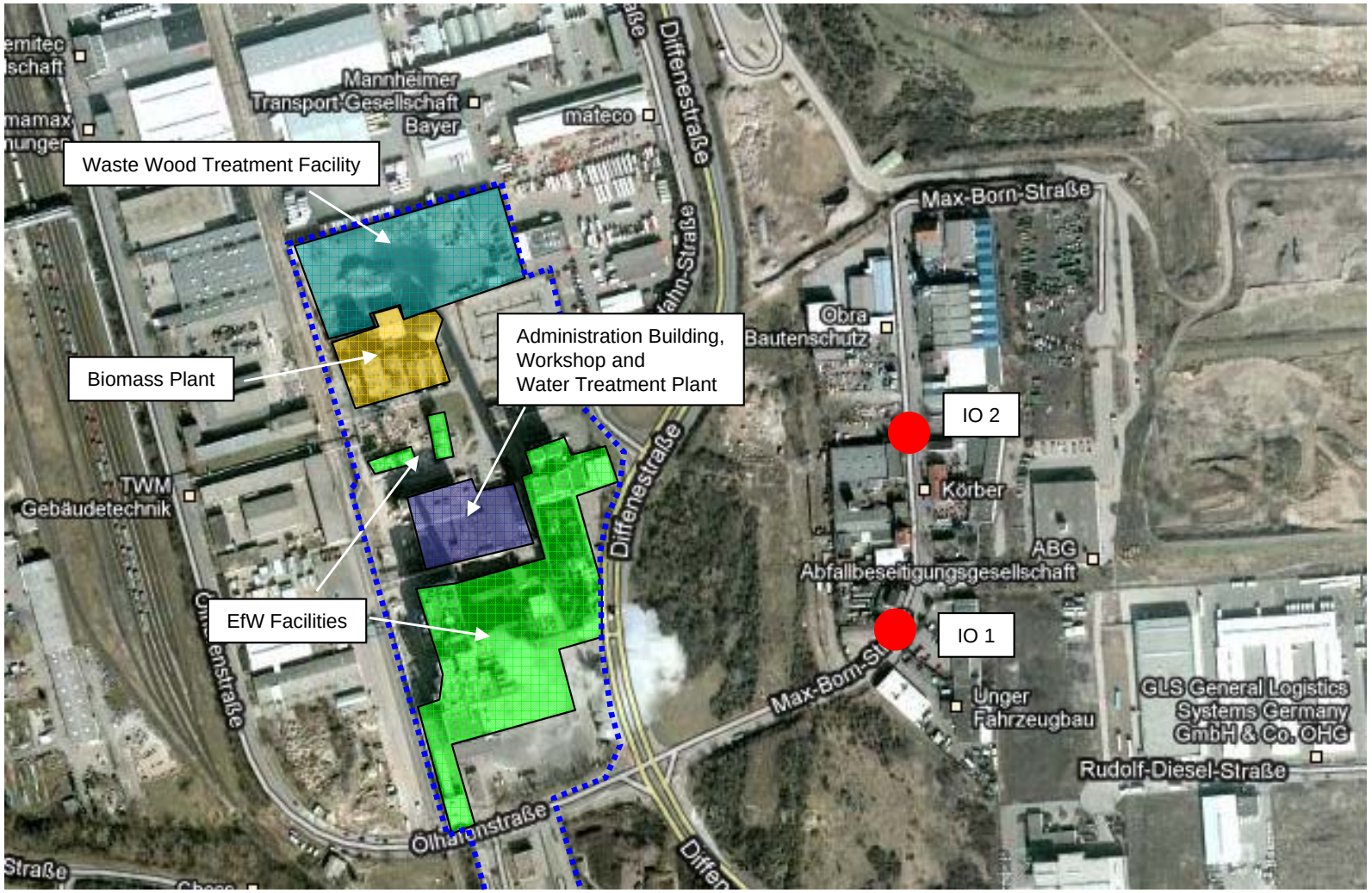
MVV Umwelt

MVV proudly presents SWDWP EfW CHP Facility

27.4% Net Efficiency in Full Power Mode
48.8% Net Efficiency in Full CHP Mode*
****with 30 t/h steam off-take***

MVV's high efficient EfW CHP Facility will be UK's most efficient EfW Facilty

Noise Monitoring of EfW and Biomass Facility at Mannheim
Location Map



MVV Umwelt

Noise Monitoring of EfW and Biomass Facility at Mannheim
Background Information

Boundary Conditions of Noise Monitoring	Position and Description of Monitoring Point
Date	12th of February 2008; 22:00 – 24:00 o'clock
Weather Conditions	Light wind from East, 7°C outside temperature, starlite sky

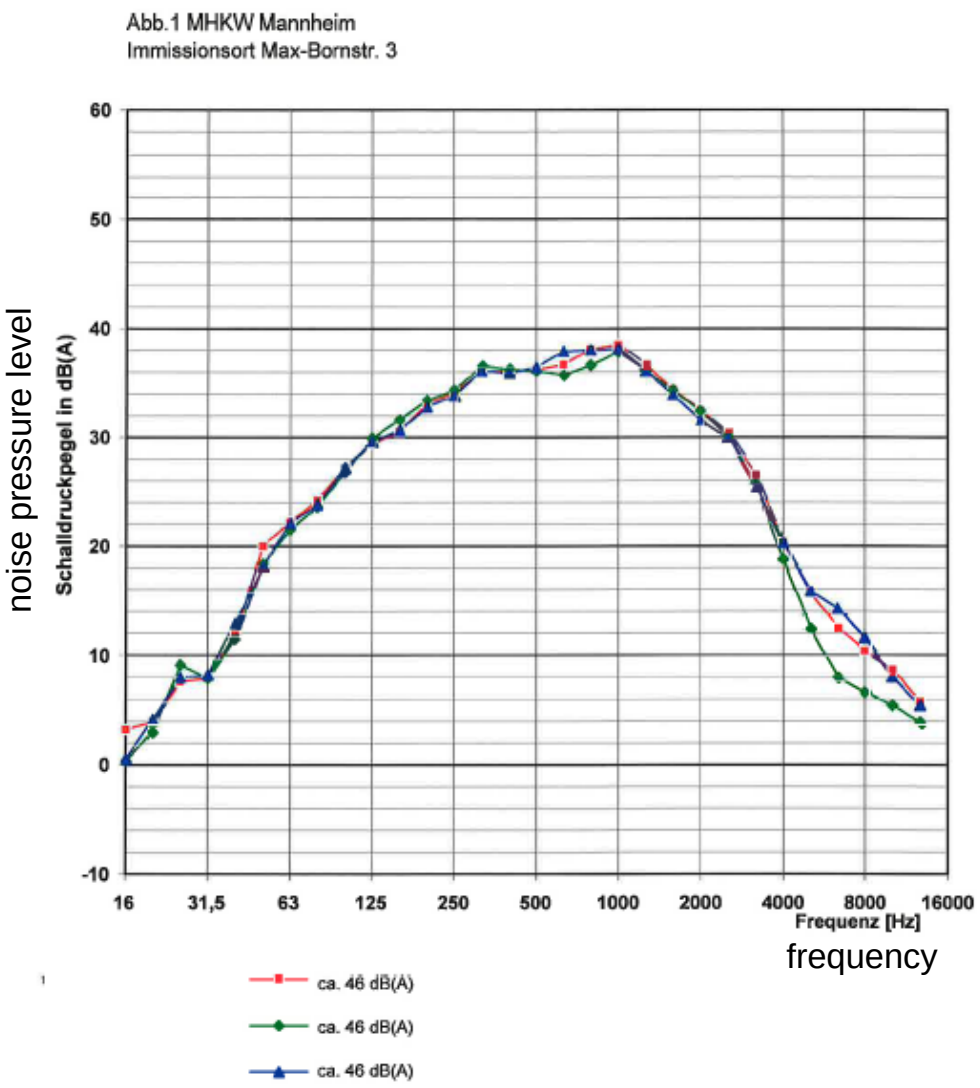
Boiler Line Status Facility Mannheim	Load
EfW Boiler Line 2	93%
EfW Boiler Line 3	81%
EfW Boiler Line 4	100%
EfW Boiler Line E	shut-down
Biomass Plant	100%
Waste Wood Treatment Facility	100%

Monitoring Point	Position and Description of Monitoring Point
IO 1	„Max-Born-Straße 3", approximately 5 m in front of the facade at a height of 6 m
IO 2	„Max-Born-Straße 9", approximately 3 m in front of the facade at a height of 6 m

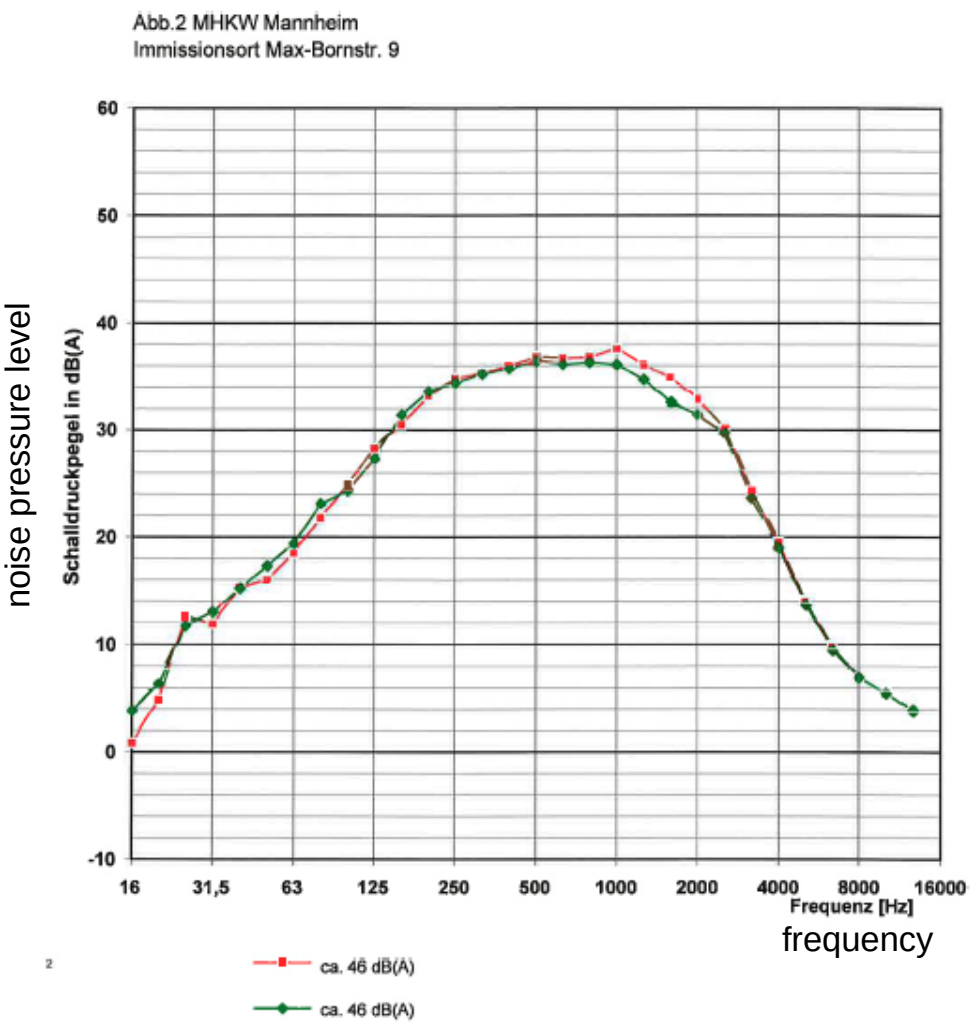
3 EfW lines, 1 boimass plant and a waste wood treatment facility in opetration

Noise Monitoring of EfW and Biomass Facility at Mannheim
Noise Monitoring Results

Monitoring Point IO 1



Monitoring Point IO 2



MVV Umwelt

Thank you very much for your attention

MVV Umwelt