

Combination of noise and air pollution abatement plans

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In particular there is one good reason to draw up combined noise and air pollution abatement plans: Air and noise abatement plans have the same target - to preserve an environment which is worth living for and to support health care. Over and about that point there are further common grounds to set up combined noise and air pollution abatement plans: common hot spots, comparable critical traffic amounts, common data pool and suitable measures. The demands of the EG environment directives for noise abatement and clean air as well as the economical limits will create a great need of combined abatement plans.

1. Common hot spots

- Usually air pollution and noise abatement planning concern the same road courses.
- Most times the hot spots of the air pollution are a part of the hot spots of the noise pollution (Fig. 1 and 2).

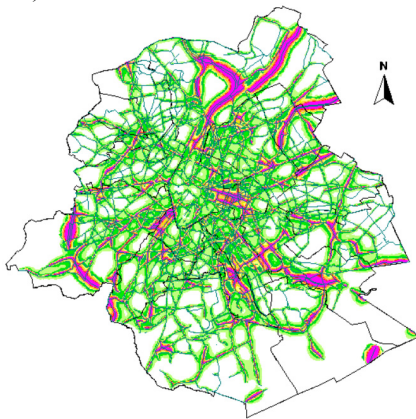


Figure 1: Air pollution, Example Brussels
Source: Wölfel GmbH&Co

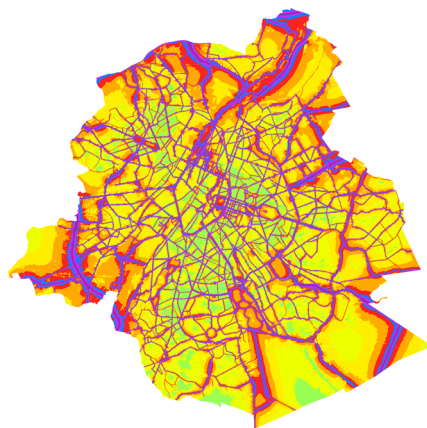


Figure 2: Noise pollution, Example Brussels
Source: Wölfel GmbH&Co

2. Comparable critical traffic amounts

The exceeding of the European limit values for air conservation and the critical noise values causing health risks are affecting nearly the same types of streets [1]:

- out of town
 - air pollution more than 20.000 vehicles/day
 - noise more than 15.000 vehicles/day
- built-up areas with high-density housing
 - air pollution more than 4.900 vehicles/day
 - noise more than 4.000 vehicles/day

3. Use of a common data pool

The combined calculation of air and noise pollution can use many data in common. In this the necessary data for the noise calculation are part of the necessary data for the air pollution calculation.

Table 1: necessary data for the calculation of air and noise pollution [1]

necessary data	air pollution		noise		
	overview screening	exact screening	dispersion	noise level map	persons affected
road network hierarchy	(x)	(x)	(x)	x	x
distance street - impact	x	(x)	x	x	x
terraced/detached houses	x	x	x	x	
width of the street	x	x	x	x	
distance building - kerb	x		x		
distance building - middle of the road				x	x

necessary data	air pollution		noise		
	overview screening	exact screening	dispersion	noise level map	persons affected
volume of traffic	x	x	x	x	x
share HGV > 3,5 t of the volume of traffic	x	x	x		
share HGV > 2,8 of the volume of traffic				x	x
share delivery vans of the volume of traffic		x	x		
measuring data air pollution background level		x	x		
number of inhabitants	(x)	(x)	(x)		x
air emissions measurement data from great emitters		(x)	x		
emission inventory		(x)	(x)		
emitters with high dust pollution i.e. agriculture		(x)	x		
diffusion inventory		x	x		
average rainfall frequency		x	x		
geometry of the road network with volume of traffic > 4.700 vehicles / day and > 500 HGV / day		x	x	x	x
condition of the road surface (damaged / intact)		x	x	(x)	x
kind and condition lateral road surface (damaged / intact)		x	x		
frequently dirty and unseal road surfaces		x	x		
road surface		x	x		
age of the road		(x)	(x)		
height of the buildings		x	x	x	x
number of lanes		x	x	x	x
traffic situation according to the handbook of emission factors: position/function of the road, kind of traffic regulation, traffic flow, average speed		x	x		
position traffic lights		x	x	x	x
inhabitants /road section		(x)	(x)		
slope %		x	x	x	x
kind of land use (existing/planned)		x	x	x	x
speed limit				x	x

x = data absolute necessary, (x) = data useful but not necessary

4. Common use of traffic models

Traffic models on the basis of a current traffic census are a necessary precondition to calculate

- the air pollution and
- the noise immissions.

Traffic models can be used for

- analysis of the current situation,
- prediction of the measure effects and
- evaluation of the measures.



Figure 3: Traffic model – prediction

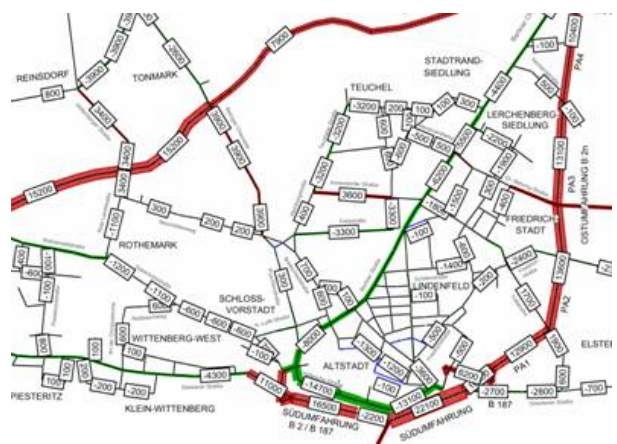


Figure 4: Traffic model – difference prediction to status quo

5. Suitable measures for air and noise abatement

According to the state of the art in spring 2005 the following measures can be recommended for combined air and noise abatement plans:

measures	effect		
	short	med.	long
<i>speed limit</i>	x		
<i>driving ban / restrictions for special areas</i>	x		
<i>HGV driving ban for special roads (without public transport)</i>	x		
<i>low-noise roadway surface</i>	x		
<i>roundabouts instead of traffic lights</i>	(x)	x	
<i>constant traffic circulation</i>	(x)	x	
parking lot management	(x)	x	
mobility management (especial for companies)	(x)	x	
support low-noise and low-polluting vehicles	(x)	x	
support pedestrians	((x))	x	(x)
support bicycles	((x))	x	(x)
better transport capacity of the public transport	((x))	x	(x)
<i>new bypas and reconversion of the former main road</i>		(x)	x
logistic concept goods transport		(x)	x
<i>urban development, land use plan</i>		(x)	x
regional planning		(x)	x

Table 2: Suitable abatement measures for air and noise pollution ([1], state spring 2005)

Many measures are suitable to reduce air and noise pollution. In a combined air and noise abatement plan of course those measures are most important which have a positive effect for both plans (green highlighted in table

2). After that measures are acceptable which have positive effects on one plan and have no effects on the other plan.

There is much experience with measures for noise abatement, but there is a great need of experiences with measures to reduce air pollution especially particle (PM10).

Closing recommendations

The motto should be:

- **combined** data collection and provision,
- **integrated** noise and air pollution abatement planning,
- **coordinated** implementation of the measures.

Despite this common ground there are serious differences in the procedure of noise and air abatement planning [2]:

- There are no limit values for noise on the European level - the limit values for the air quality are valid Europe wide.
- Everybody can recognize noise pollution - air pollution usually can only be recognized by medical-epidemiological examination.
- Because of the missing limit values for noise, the noise abatement policy does not need short-time successes - the limit value for air must be kept at a certain time.
- To reduce the number of persons affected noise abatement planning uses a concentration policy - air abatement planning tries to spread the emissions to cut the peaks of pollution and to keep the limit values.
- If both abatement plans are separated in the terms of content and the period of time it is probable that the first planning step makes obligations for the second.

According to the present state of the art the following phrases can be set, which must be updated with the growing experience:

- The hot spots of the air pollution are just partial critical – hot spots of noise pollution are scattered across the hole street network.
- Hot spots of the air pollution are part of the hot spots of the noise pollution.
- Measures for noise abatement cover most of the hot spots of the air pollution (data, abatement po-

tentials, measures) opening the chance for using synergy effects.

- The isolated drawing up of an air pollution plan is not able to develop synergy effects for a following noise abatement plan.
- The expenditure for the calculation of the air pollution is clearly higher than for the calculation of strategic noise maps.
- The reduction of the hot spots of particles (PM10) mostly needs more extensive measures with a deeper cut in the transport infrastructure than the reduction of the noise hot spots.

Therefore

- it is qualitatively and economically practical to draw up a combined air and noise abatement plan.
- If a combined draw up is not possible, the noise abatement plan should be drawn up before the air abatement plan to use the possible synergy effects. To draw up the air abatement plan before the noise abatement plan is because of the high expenditure for just a few hot spots no real sense.

But this procedure which is not to be recommended, has been put into praxis because of the schedules in different EG environment directives. Therefore there is a big need to harmonize the different schedules. If this will not happen in future amendments of EG-directives or national laws the responsible departments should try to compress or to stretch the schedules for the second phase air quality (2010) or rather noise abatement (2013) to enable a combined drawing up of the air and noise abatement plans. By the difference of three years (2010/13) is ensured, that the demand of the EG noise directive "data not older than three years" is remains fulfilled.

References

- [1] I. Düring, J. Richard, '*Machbarkeitsstudie zur kombinierten Luftreinhalte- und Lärminderungsplanung*', Aachen/Radebeul 2002
- [2] I. Düring, C. Popp, J. Richard, '*Kombinierte Lärminderungs-/Luftreinhalteplanung Fontanestadt Neuruppin*', Aachen/Hamburg/Radebeul 2005