
Noise Assessment and Control: Paper ICA2016-79

Noise action planning in Germany

Matthias Hintzsche ^(a), Eckhart Heinrichs ^(b)

^(a) German Environment Agency, Germany, matthias.hintzsche@uba.de

^(b) LK Argus GmbH, Germany, heinrichs@LK-argus.de

Abstract

In 2002, to improve the noise situation in Europe, the EU issued the Environmental Noise Directive (2002/49/EC). It became law in Germany in 2005. The aim of the Directive is to reduce environmental noise and to prevent an increase in noise in areas which are traditionally quiet. This first requires mapping the level of noise pollution in different areas and then introducing specific measures to reduce it. The EU Directive envisages progressive implementation of its provisions. Since 2012, noise levels in all conurbations and on all major transport routes in Europe need to be recorded. In Germany, this involves 71 conurbations with around 24.5 million inhabitants, 44,000 kilometres of motor-ways and major trunk roads, 13,700 kilometres of major railway lines, and all eleven major airports. Moreover, effective noise abatement measures had been established in Noise Action Plans. The state of all Noise Action Plans until 2015 were analysed. Experiences, promising approaches and difficulties were compiled. A report provided guidance for the improvement of Noise Action Plans and their general conditions.

Keywords: Environmental Noise Directive, Noise Maps, Noise Action Plans

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1 Environmental Noise Directive

In 2002, to improve the noise situation in Europe, the EU issued the Environmental Noise Directive (2002/49/EC). It became law in Germany in 2005. The aim of the Directive is to reduce environmental noise and to prevent an increase in noise in areas which are traditionally quiet. This first requires determining the level of noise pollution in different areas and then introducing specific measures to reduce it. The EU Directive envisages progressive implementation of its provisions. The first stage involved initially only motorways and major trunk roads, major railway lines, and various major airports with a high volume of traffic as well as large agglomerations.

Since 2012, noise levels in all agglomerations and on all major transport routes in Europe need to be recorded. In Germany, this involves 71 agglomerations with around 24.5 million inhabitants, 44,000 kilometres of motorways and major trunk roads, 13,700 kilometres of major railway lines, and all eleven major airports (figure 1). In each case, the noise levels need to be determined over the course of the entire day and separately at night-time. To ensure comparability of the results, uniform pan-European indicators are used, the day-evening-night noise indicator (L_{DEN}) and the night noise indicator (L_{Night}).

2 Noise Balance 2015

The Noise Balance 2015 [1] project, funded by German Environment Agency, analyses the reports submitted by the German federal states on noise mapping and noise action planning. The research basis of this was formed by taking the data held at the German Environment Agency and thoroughly examining its plausibility, consistency and possible redundancies. The study at hand presents its results using descriptive statistics and analyses these to reveal any potential correlations between the individual aspects. On this basis, a current overview of stage two noise action planning in Germany is achieved. Selected data is also compared to the data produced for stage one (Noise Balance 2010 [2]).

The scope of this study includes all submitted reports up to 1 January 2015. A total of 6,094 reports on noise mapping and 2,950 reports on noise action planning were submitted by this cut-off date. After adjusting these figures to account for single municipalities submitting multiple noise action planning reports, as well as several municipalities submitting a joint noise action planning report (associated municipalities and local authorities), there remains a total of 2,065 municipalities with noise action planning reports. Out of these, 149 reports were in relation to stage one of the noise action planning project; resultantly, the study at hand documents a total of 1,916 reports on stage two noise action planning.

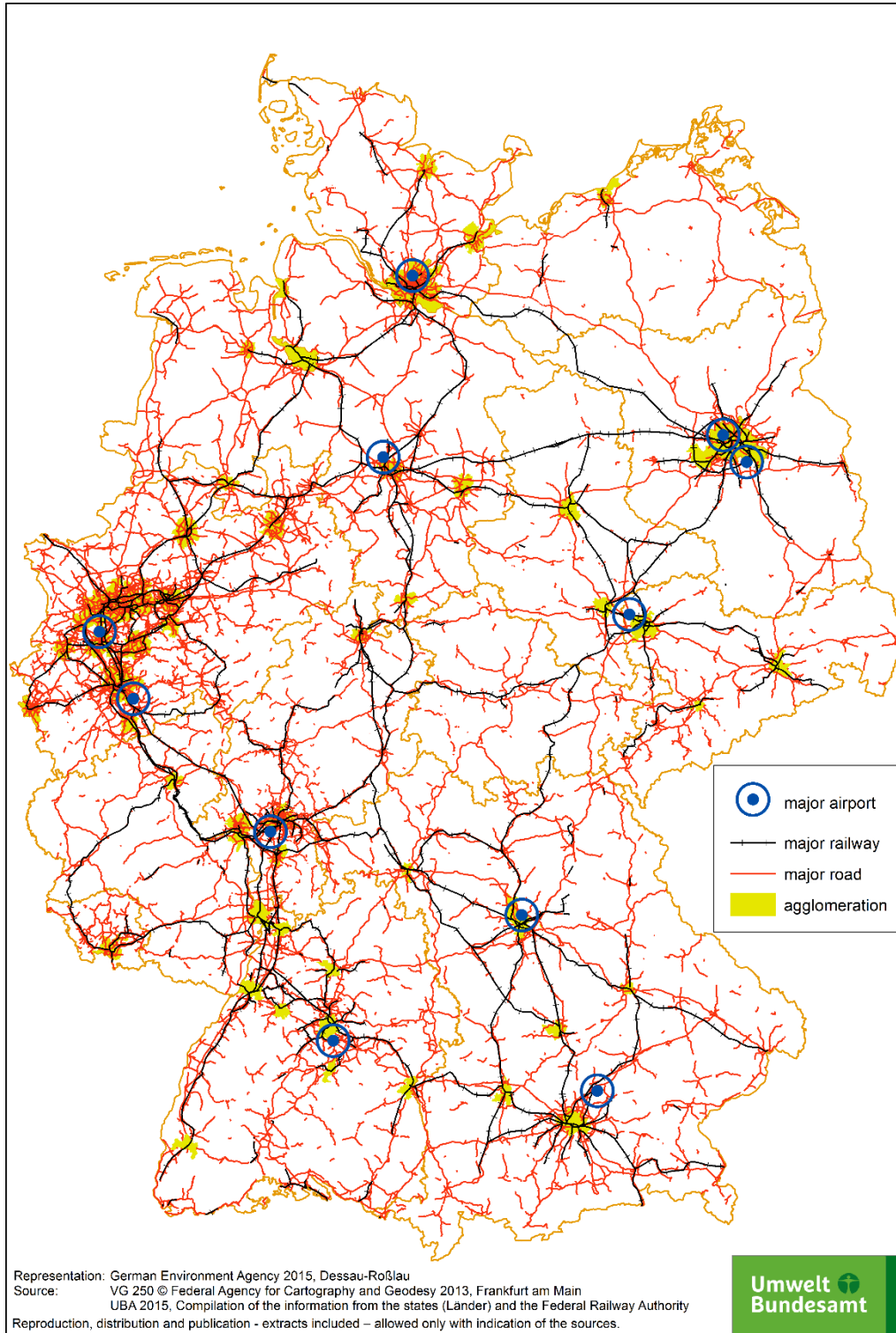


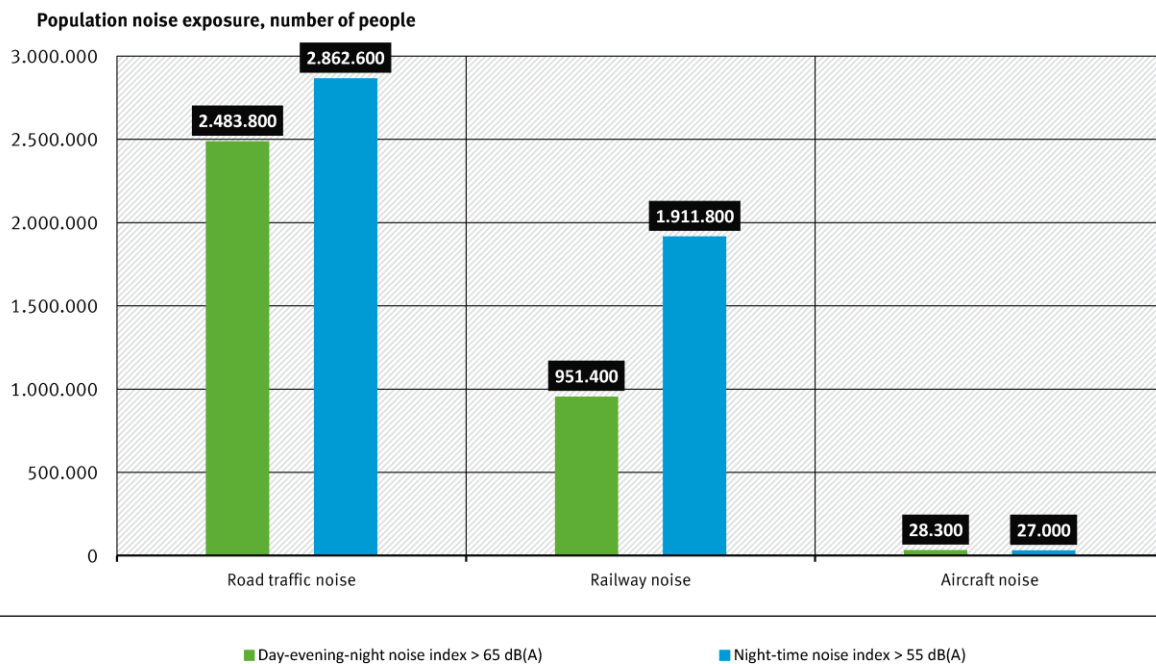
Figure 1: Agglomerations, major roads, major railways and major airports

3 Noise mapping

Reports on noise mapping are available for a total of 6,094 municipalities across Germany. This means that in more than half of Germany’s approx. 11,420 municipalities, at least one noise source has been mapped within municipal boundaries. Approx. 73.2 million people lived in these noise-mapped municipalities. 91% of Germany’s approx. 80.8 million inhabitants are therefore able to view the noise map of their municipality.

Out of the 6,094 noise-mapped municipalities, 5,483 contain affected residential areas. This corresponds to 90% of the noise-mapped municipalities and approx. 50% of all the municipalities in Germany.

Population exposure to traffic noise according to Environmental Noise Directive
around major roads, major railways, major airports and in agglomerations



As of 29.02.2016

Source: Federal Environment Agency 2015, Compilation of the information from the states (Länder) and the Federal Railway Authority in accordance with § 47c BImSchG

Figure 2: Population exposure to traffic noise according to Environmental Noise Directive

The reports on noise mapping reveal the following details:

- Road traffic was mapped in 5,640 municipalities (49% of all the municipalities in Germany); 5,077 of these contain affected residential areas.
- Noise maps for railway traffic are available for 2,218 municipalities (19%); out of these, 1,960 contain affected residential areas.
- Air traffic was mapped in 104 municipalities (0.9%), with residential areas being affected in 92 of these.
- Commercial and industrial noise sources were mapped in 32 municipalities (0.3%); in these, no residential areas are affected.

Approx. 30% of the reporting municipalities maintain maps for multiple noise sources. In approx. 70%, only a single noise source was mapped.

For almost all towns and cities with more than 20,000 inhabitants, there is a noise map for at least one noise source. As the number of inhabitants decreases, so does the likelihood of the municipality being mapped. Comparing the current reports on noise mapping to the 2010 data reveals an increase in mapped municipalities. In stage two of the noise action planning project, a total of 64% more municipalities were mapped for noise than in stage one. This upswing is most pronounced in the area of railway traffic. With 2,218 mapped municipalities by the end of 2014, the number of noise maps has more than doubled for this noise source since 2010.

4 Noise action planning

4.1 Spread of noise action planning

The 1,916 reports on noise action planning were largely submitted using the federal states' standard forms. In some instances, more detailed reports or even full-scale noise action plans were submitted (figure 3).

North Rhine-Westphalia and Schleswig-Holstein were the states that submitted the most reports. Compared to the 2010 findings, almost all of the states submitted more reports. Only Brandenburg, Hesse and Saarland submitted fewer reports by the cut-off date than before.

In total, approx. 31% of the noise-mapped municipalities and 17% of all the municipalities in Germany have submitted a report on noise action planning. In terms of overall population, reports on noise action planning were submitted on behalf of 44.9 million inhabitants. This corresponds to 56% of the total population (80.8 million); in terms of the population within noise-mapped municipalities (73.2 million), it corresponds to 61%. Looking at the individual populations of the federal states, action plans reported from the city states and North Rhine-Westphalia cover the most people.

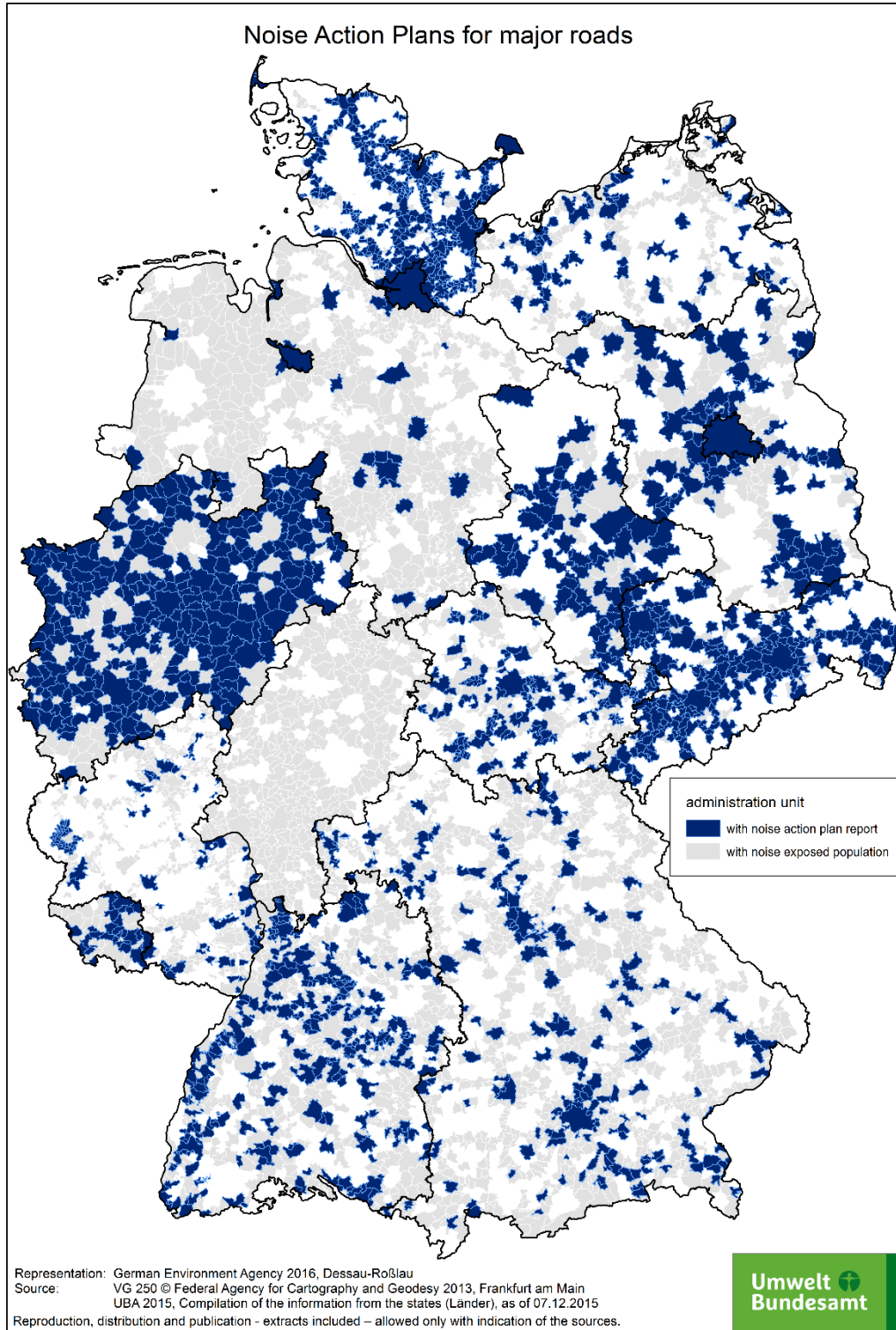


Figure 3: Noise-mapped municipalities with and without noise action plan reports for major roads

Municipality populations range from 0 to 3.4 million inhabitants for each municipality that has reported noise action planning. The median is around 6,700, while the arithmetic mean is around 23,400 inhabitants. Larger-than-average municipalities are predominantly to be found in Hesse, Lower Saxony and North Rhine-Westphalia. Smaller-than-average municipalities were noted for the reports received from Mecklenburg-West Pomerania, Rhineland-Palatinate, Schleswig-Holstein and Thuringia. In contrast to the 2010 findings, the current results show that while fewer municipalities in Hesse and Lower Saxony submitted reports, those municipalities were also above average in size.

There is a correlation between the population size and the reporting of a noise action plan. Small and medium-sized municipalities with noise maps submit reports less frequently than large cities. The same correlation was noted for stage one in 2010.

4.2 State of progress

The analysed 1,916 reports indicate that 30% of the noise action plans have been instated and that another 24% are currently in progress. For 5% of the reports, the necessity of a noise action plan was still being verified at the time of submission. 785 municipalities reported that either they had no need for noise action planning, no suitable organisational resources, or that the level of progress could not be determined.

In total, then, close to a tenth of Germany's approx. 11,420 municipalities have at least assessed whether or not they require noise action planning. The resultant activities vary widely from state to state. Particularly in North Rhine-Westphalia and Schleswig-Holstein, an above-average number of municipalities has either instated or is currently working on a noise action plan. Here, around 50 of the noise-mapped municipalities (60% of all municipalities) have reported that a noise action plan is currently in progress.

The 1,131 noise action plans that were either instated, in progress or under verification at the point of reporting cover approx. 19% of all the noise-mapped municipalities. Comparing this to the figure for noise action planning in 2010, which was 18%, there has been no significant change in this respect. Looking at the figures state by state, on the hand, there are more changes to be observed. Many states were unable to achieve the coverage level from 2010 by the 2015 cut-off date.

Looking at the state of progress of noise action planning in the context of inhabitant numbers reveals that noise action plans are devised more frequently in larger municipalities. The number of reports in which noise action planning is shown to have been postponed is significantly lower for larger than for smaller municipalities.

4.3 Planning of measures

939 reports cite measure already in planning, i.e., measures that were arrived at outside of a noise action plan. In specific, 2,390 such measures have been cited to date, 55% of which relate to traffic.

754 reports cite a total of 2,601 measures that are being or have been developed by the applicable authorities as part of noise action planning.

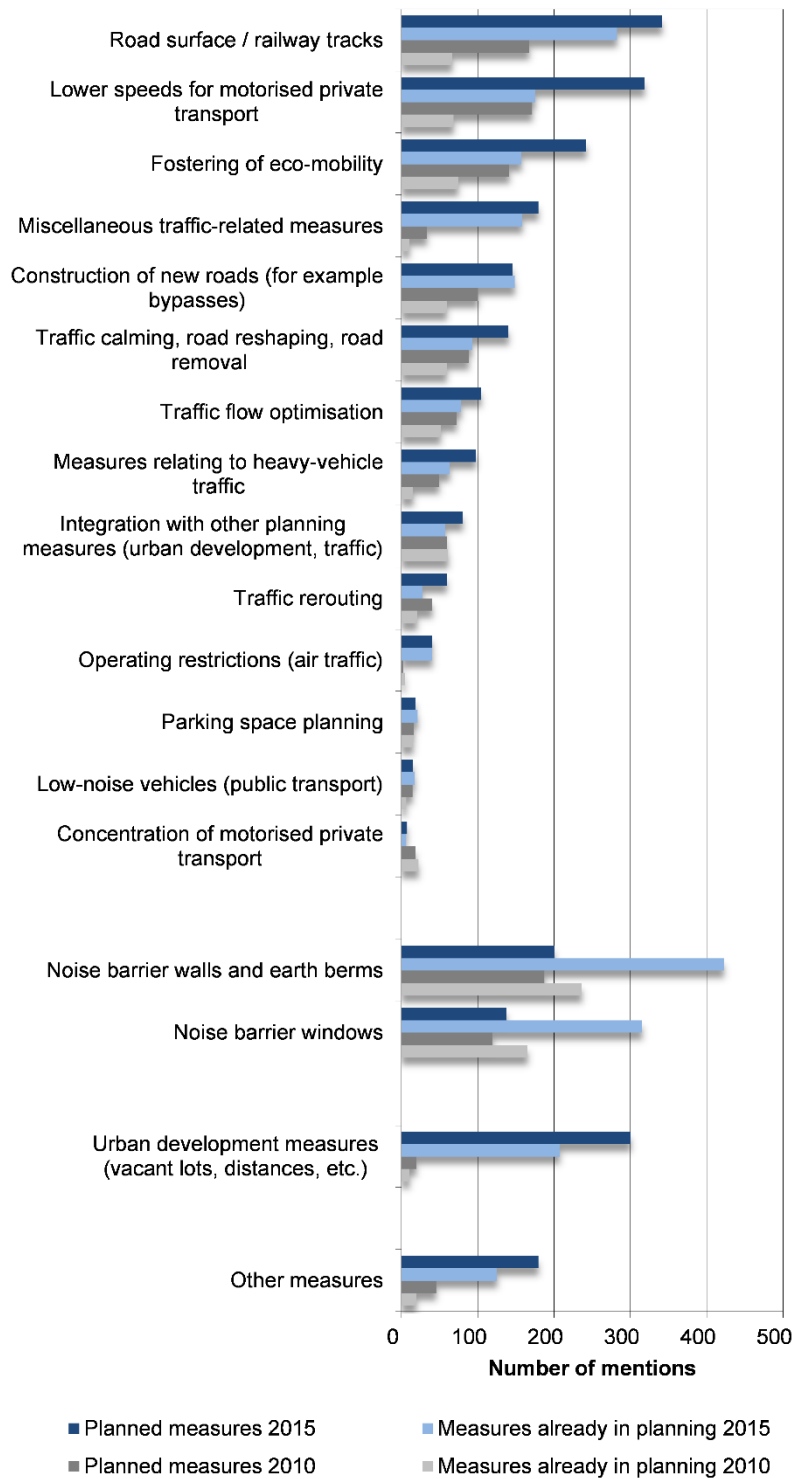


Figure 4: Planned measures as cited in reports on noise action planning, 2010 and 2015

For both the 2010 and 2015 stages, the frequency of measures per reported noise action plan is roughly the same. Similarly, the prevalence of traffic-related measures also remains largely unchanged. In terms of the measures developed as part of noise action planning, urban development measures have increased, whereas measures such as noise barrier walls and windows have decreased (figure 4).

4.4 Informing and involving the public

The noise action planning aspect cited most frequently across the submitted reports is to inform and involve the public. 944 out of the 1,916 reporting municipalities provided details about public involvement.

Compared to stage one, analysis of the reports gathered by the cut-off date reveals an increased emphasis on the Internet and less direct communication measures such as public discussion events. In stage two, information was more frequently disseminated using press releases and newsletters.

In those municipalities that developed their own noise action plan measures, the public was informed and involved the most. Out of the 754 reports citing noise action plan measures, 554 (73%) additionally cited measures towards public involvement. Out of the 1,162 municipalities without noise action plan measures, there were also 390 (34%) that reported activities towards public involvement and information. In both cases, the most frequently cited measures in this regard were the provision of information via the Internet and the public display of the noise action plans.

4.5 Quiet zones

Out of the 1,916 German municipalities that have reported noise action planning, 247 (13%) indicated that their action plans included the creation of quiet zones. The large majority of municipalities – 1,669 (87%) – did not make any mention of quiet zones. Compared to the 2010 findings, these figures are largely the same, which in the context of the overall increase of noise action planning reports signifies a considerable percentage drop.

5 Conclusions

Large parts of the population in densely populated and congested Germany are affected by noise. Recent noise mapping results show that more than 4.8 million people were exposed to night-time noise levels above 55 decibels dB(A) in agglomerations, along main roads and around major airports. In addition, more than 3.4 million people were also affected by noise levels above 65 dB(A) in these areas throughout the day. These noise levels pose a greatly increased health risk for the affected population. A short-term environmental quality objective is therefore to avoid high noise levels. For this, the existing tools for noise protection must be used more efficiently and in a more targeted way.

Noise mapping and noise action planning are important tools for noise protection in Germany. Noise mapping has been established in the German Federal Immission Control Act since June 2005 and is the basis of informing the population and developing action plans. In the EU this is

done in accordance with uniform standards based on the Environmental Noise Directive. The aim is to reduce ambient noise and prevent an increase in noise in previously quiet areas. For this, noise pollution must be determined on noise maps and then reduced by specific measures. Noise maps had to be drawn up by 30 June 2012, and noise action plans established by 18 July 2013.

Noise mapping has been carried out for 71 agglomerations totalling approximately 24.5 million inhabitants, for 44,000 kilometres of major roads, 13,700 kilometres of major railway lines and eleven major airports in Germany.

Based on noise mapping and noise action planning, many cities and municipalities have taken measures to reduce noise pollution. These include, for example, noise-reducing road surfaces or speed reductions on frequently used roads.

References

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