07.05 Strategic Noise Maps 2022

Overview

Legal Provisions and Competent Authorities

The "Directive of the European Parliament and of the Council relating to the assessment and management of environmental noise" (Directive 2002/49/EC) came into force on July18, 2002, when it was published in the Official Journal of the European Communities (now Official Journal of the European Union). For the European Communities, this opened the path to legal provisions covering noise immission into the environment.

The European Commission describes one of the rationales behind the Directive as follows:

“It is part of Community policy to achieve a high level of health and environmental protection, and one of the objectives to be pursued is protection against noise.”

It is therefore necessary, “to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. To that end, the following measures shall be implemented progressively:

> (a) the determination of exposure to environmental noise, through noise mapping, by methods of assessment common to the Member States;
>
> (b) ensuring that information on environmental noise and its effects is made available to the public;
>
> (c) adoption of action plans by the Member States, based upon noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.”

Furthermore, the Directive is intended to provide a basis for further developing and supplementing noise emission measures concerning the most important noise sources and to inform the European Commission about the exposure to environmental noise in the Member States.

The Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action (SenUMVK) has commissioned and carried out the Noise Mapping 2022 (Level 4 updating the mapping of 2017) for the Berlin conurbation in accordance with the requirements of the Ordinance on Noise Mapping (Articles 4 and 5 of the amended 34th BImSchV in combination with Article 47 c BImSchG and Directive 2002/49/EC (EU Environmental Noise Directive)) and taking into account the current noise mapping instructions of the LAI (Federal Committee for Ambient Air Quality Protection).

A number of different authorities are responsible for developing noise maps. Only those developed by the Senate Department for the Environment, Mobility, Consumer Protection and Climate Action are published here, addressing the areas of road traffic (motor vehicles incl. trucks and buses), tram traffic and underground traffic (of the above-ground sections), air traffic (BER) and IED plants (power plants).

The analysis of rail traffic noise according to the General Railway Act (AEG) is published here on the pages of the Federal Railway Authority (EBA, only in German).

The objective of the project is to develop strategic noise maps and prepare relevant statistical evaluations (exposed people, dwellings, schools and hospitals in specific immission level classes). The results were processed for further use with the following aspects in mind:

- basis for reporting to the EU and information of the public;
- basis for the continuation of the Noise Action Plan 2019-2023 (Berlin noise reduction planning (only in German));

- basis for the management of the source data (data model maintenance);
- basis for recalculations and the evaluation of demarcated areas.

Sections 47 a to f of the Federal Immission Control Act (BImSchG) regulate the implementation of the EU Environmental Noise Directive into German law. The Ordinance on Noise Mapping, 34th BImSchV, defines the requirements for noise maps in detail according to Article 47 c of the BImSchG.

Noise maps must always be based on calculations. These calculations are carried out according to EU-wide uniform calculation methods (CNOSSOS-EU) as well as the national calculation regulations applicable in this context (BUB-D).

Noise maps are to be reviewed and, if necessary, updated every five years from the time of their creation (Level 1 in 2007; Level 2 in 2012; Level 3 in 2017; Level 4 in 2022 etc.). The State of Berlin has met this obligation for all of the above-mentioned levels to date.

General description of the main noise sources by location, size and traffic volume/ mapping scope

The study area lies within the borders of the State of Berlin. Noise sources to be investigated include:

- road traffic (motor vehicles including buses);
- tram traffic and underground traffic of the above-ground sections;
- industrial and commercial sites with facilities according to Annex 1 of the European Industrial Emissions Directive (IED);
- air traffic; and
- rail traffic according to the General Railway Act (AEG).

Other relevant main sources of road traffic noise, located in the Brandenburg region bordering on Berlin, were also included if they exceeded the specified immission levels.

Table 1 provides an overview of the noise sources included in the responsibility of the State of Berlin:

Tab. 1: Representation of the main noise sources for the Noise Mapping 2022 in the Berlin conurbation

Noise source	Network	Route length
Road traffic	Federal motorway/ federal highway	349.3 km
	City road	1,420.8 km
Tram traffic and underground traffic (above-ground)	Tram	205.9 km
	Underground (above-ground)	28.6 km
Industrial/ commercial noise IED plants	18 power plant locations	
Air traffic	Berlin Brandenburg Airport (BER)	

Tab. 1: Representation of the main noise sources for the Noise Mapping 2022 in the Berlin conurbation

The State of Brandenburg is responsible for the noise mapping of Berlin Brandenburg Airport (BER). Their mapping results for the Berlin conurbation were adopted and documented (Wölfel 2022, only in German).

With regard to tramway rail transport, the route lengths differ from those of the 2017 mapping, as new route sections were introduced (e.g. by connecting Adlershof Science City to the network).

Constraints when considering noise pollution totals

To date, the legal regulations described above do not include the formation of overall noise levels. Each main noise source is determined and assessed separately. However, the 2004 Environmental Report, p. 490, of the Advisory Council on the Environment (Sachverständigenrat für Umweltfragen), already states that "a decrease of the noise pollution of the population can therefore only be successful if the combined effect of various sources of noise is also taken into account" (translated from German).

Since, however, the dose-response relationships of several sound sources occurring at the same time have been extremely difficult to describe from a medical and psychological point of view until now, a simplified approach was chosen here:

- All immission values of the main noise sources are assigned the same level of annoyance, i.e. annoyance factors specific to the type of noise by means of a bonus-malus system are not assigned.
- Only the sound energy of the individual noise sources is added up.

Note: The mapping of the railways under the General Railway Act (AEG) by the Federal Railway Authority has been included in the consideration of the total noise pollution (as of February 2023).

When considering a noise pollution total, the peculiarities of the logarithmic decibel scale must be kept in mind. For instance, adding the volumes of two 50 dB(A) events results in 53 dB(A). The human ear, however, perceives this increase by 3 dB(A) as double the noise. Adding two sound components of 50 dB(A) and 60 dB(A) results in 60.4 dB(A).

Statistical Base and Calculation Model

Please note that additional, more detailed information, in particular regarding the methodological approach and the differences to the approach used in the noise mapping of 2017, may be found in the published project report of the commissioned engineering firm (Wölfel 2023, only in German).

Statistical Base

The input data available to the State of Berlin in the reference year 2021 was used for the sound calculations of the maps published here.

Mapping Area

The mapping area covers the area of the State of Berlin, amounting to 892 km². The noise pollution of 3,677,232 inhabitants was investigated (as of December 31, 2021).

Terrain Model

The terrain elevations for the Level 4 Noise Mapping were taken from the Digital Terrain Model DTM1 (as of January 2022). All elevation points of the 1 m grid were used without having undergone any further editing or simplification.

Noise Control Facilities

The location and height of noise control facilities on roads and rail lines were adopted from the Level 3 (2017) Noise Mapping. Based on knowledge of the locale and in coordination with the client, additions and corrections were made to the data where required. The absorption behaviour of the noise control facilities was adapted to the standard absorption ranges according to Table 9 of the LAI noise mapping instructions (LAI 2022).

Special Structures

Tunnels

Tunnel structures were included in the calculation model as interruptions to the route. Tunnel openings were not modelled as separate sound sources.

Railway Stations

The same method used for open track is applied for calculating emission levels from train movements in railway stations. The travel speed is not reduced. Shielding by platform edges and station buildings is not considered in the calculation of rail noise. Station buildings are factored in as barriers for other types of noise, however.

Road Bridges

The calculation model contains 894 bridge sections with a substantial acoustic impact on nearby buildings due to the elevation of a road or railway. In these cases, a reflective bridge slab was designed with the same width as the road or railway.

Please note the following when using the noise map: bridge structures are not part of the terrain surface; rather, they are located on the surface. **Noise maps are calculated at a height of 4 m above the ground. Their measurements may thus be recorded at a height below a "noisy" road bridge acting as a sound barrier, which may result in low immission levels at the measurement point.**

Assignment of Buildings and Inhabitants

A total of 541,291 building floor plans were adopted from the Official Property Cadastre Information System (ALKIS) of the State of Berlin (SenSBW n.d.) and a small number of records that had subsequently been digitalised by hand. These floor plans also included the number of floors and the following building uses (see Table 2):

Tab. 2: Building uses and number of buildings, used as input parameters for the Strategic Noise Maps of Berlin of 2022

Use	Number of buildings
Residential	305,574
School	3,071
Hospital	929
Children's day care centre*	1,383
Other	230,334
*Children's day care centres are included here for information purposes only. They are generally not included in exposure statistics.	

Tab. 2: Building uses and number of buildings used as input parameters for the Strategic Noise Maps of Berlin of 2022

The building height was calculated from the number of storeys applying the formula *building height = 3.2 m + number of storeys x 2.8 m*. It was derived from the EBA building data set that each dwelling has an average volume of 414.4 m³. By further assigning 2.1 inhabitants to each dwelling, the number of inhabitants was determined for each residential building (classification based on the ALKIS object key) from the building volume (*inhabitants = 2.1 x volume / 414.1 m³*). Mixed residential buildings with commercial use were only assigned half the volume (Wölfel 2023).

Building facades are included in the calculations as reflective with a "smooth/ reverberant" surface according to Table 9 of the LAI instructions (LAI 2022).

Dwellings

The number of affected dwellings is derived from the known number of affected inhabitants. A flat ratio of 2.1 inhabitants per dwelling is applied, which was also suggested in the LAI instructions (LAI 2022).

Road location and traffic

The Noise Mapping 2022 is based on the city road and motorway network from the environmental network (data basis: *VMZ-Detailnetz,* as of February 2022) of the Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action as well as traffic volumes from the 2019 census including updates of permissible maximum speeds and road-related parameters from 2021.

We would like to refer to Chapter 4.7 of the project report (Wölfel 2023) once again, which explains the complexity of factoring in various influences in the calculation model in regard to roads (traffic volumes, standard cross-sections, road surface types, etc.).

A total of 1,770 km of road network were included in the calculation. Other relevant primary network roads in the Brandenburg region, located no more than 2 km from the Berlin border, were also included if they exceeded the defined immission level results.

Tram and Underground (Above-Ground Sections) Location and Traffic

Tram

A total of 205.9 km of the tram network was modelled:

- correction of the position based on the network geometry planning documents of the tram tracks provided by the BVG, with reference to orthophotos;
- counting sheets of all BVG tram journeys in regular service and trips to the depots based on the schedule of Schöneicher-Rüdersdorfer Straßenbahn GmbH on December 17, 18 and 19, 2021; traffic averages for the year 2021;
- adaptation of road types according to BVG specifications;
- correction values for curve squeal noise by adjusting the calculation parameters to the radius of the curves; and
- adoption of current BVG information on maximum permissible speeds.

Underground (Above-Ground Sections)

Both the location of the underground network and the route parameters are based on the network of the Level 3 (2017) mapping and are used here with the following modifications:

- the interval master timetable of the BVG (valid from December 12, 2021) of the line network and the table of trips to the depots are used to update the traffic data;
- the calculation parameters are adapted to the curve radii and lubrication systems to calculate curve squeal noise.

A total of 28.6 km of the underground network was modelled.

IED Plants

The Berlin noise mapping for IED plants that impact environmental noise includes 18 power plant sites.

The sites were taken from the Level 3 (2017) mapping and transferred to that of 2022 without change.

The Lichterfelde cogeneration plant was the only site for which the areas were adapted.

Tab. 3: List of IED plants included in the Strategic Noise Maps of 2022

No.	IED Plant
1	Lichtenberg Cogeneration Plant, Rhinstraße 70
2	Mitte Cogeneration Plant, Köpenicker Straße 59-73
3	Scharnhorststraße District Heat Plant, Habersaathstraße
4	Reuter West Cogeneration Plant, Großer Spreering 5
5	Reuter Cogeneration Plant, Otternbuchstraße 11
6	Lichterfelde Cogeneration Plant, Ostpreußendamm 61
7	Charlottenburg Cogeneration Plant, Am Spreebord 5
8	Klingenberg Cogeneration Plant, Köpenicker Chaussee 42-45
9	Wilmersdorf Cogeneration Plant, Forckenbeckstraße 3-6
10	Moabit Cogeneration Plant, Friedrich-Krause-Ufer 10-13
11	Köpenick Block-Scale Power Plant, Wendenschloßstraße 176-182
12	Buch Cogeneration Plant, Schwanebecker Chaussee 17
13	Neukölln District Heat Plant, Weigandufer 489
14	Märkisches Viertel District Heat Plant, Wallenroder Straße 2
15	Lange Enden Peak Heat Plant, Lange Enden 15-25
16	Schering AG Firing Plant, Müllerstraße 178
17	BTB mbH Berlin, Albert-Einstein-Straße 22

18	Neukölln Wood-fired Cogeneration Plant, Köpenicker Straße 26

Tab. 3: List of IED plants included in the Strategic Noise Maps of 2022

Geometry/ Traffic at Berlin Brandenburg Airport (BER)

The air traffic input data is described in the documentation of the environmental noise mapping of Berlin Brandenburg Airport (Wölfel 2022, only in German).

Mapping Process for the Railways Subject to the General Railway Act

The Federal Railway Authority (EBA) carried out the noise mapping of the federal railways according to the General Railway Act (AEG) independently for the fourth time (2022).

The current data may be viewed via the EBA's map service (only in German).

Calculation Model

Software Employed

The input data was prepared and compiled in a 3D calculation model using IMMI 30 (Wölfel 2023a).

Obstacles

Obstacles, such as terrain edges, buildings and noise control facilities were taken into account by the parameters described in the input data (position, height, reflectivity, etc.). The basic terrain and obstacle model remained unaltered for the calculation of all noise types.

Determination of Reception Points

At residential buildings, hospitals and schools, the position of reception points (building facades) was determined according to the “Calculation method for determining the number of people exposed to environmental noise” (BEB, translated from German).

All inhabitants of a residential building are allocated to the half of the building facade reception points that measured the highest levels (the “noisy” half”). These points are determined by the median of the calculated facade levels L_{DEN} or L_{Night}. Reception points located in the half of the facade measuring the lowest levels (“quiet” half”) are not considered.

Note: This procedure deviates greatly from that of earlier mappings. Previously, all facade points of a building, including those recording lower levels, were taken into account. The exposure figures are therefore expected to be considerably higher now.

Plausibility Check

The plausibility check involves a visual check of 3D views of the calculation model and numerous automatic plausibility queries. The following contexts are checked in this process and corrected if necessary:

- overlap of road and tram sections with buildings;
- overlap of noise protection walls with road and tram sections, buildings or bridge structures;
- value range of emission factors (traffic, speed etc.);
- value range of building heights and areas, reflective properties;
- value range of relative and absolute heights of sound sources and obstacles;
- value range of supplied number of inhabitants per building; and
- random checks of supplied building uses.

For a detailed description of the **calculation parameters** and the **calculation method**, refer to the project report (Wölfel 2023).

Calculation Results / Analysis in Tables

In accordance with the requirements of the "Directive relating to the assessment and management of environmental noise", the strategic noise maps present the noise situation using 5 dB intervals:

Tab. 4: Representation of isophone classes according to the requirements of the amended 34th BImSchV	
	L_{Night} from 50 dB(A) to 54 dB(A)
L_{DEN} from 55 dB(A) to 59 dB(A)	L_{Night} from 55 dB(A) to 59 dB(A)
L_{DEN} from 60 dB(A) to 64 dB(A)	L_{Night} from 60 dB(A) to 64 dB(A)
L_{DEN} from 65 dB(A) to 69 dB(A)	L_{Night} from 65 dB(A) to 69 dB(A)
L_{DEN} from 70 dB(A) to 74 dB(A)	L_{Night} from 70 dB(A)
L_{DEN} from 75 dB(A)	

Tab. 4: Representation of isophone classes according to the requirements of the amended 34th BImSchV

The noise pollution according to BEB is expressed by the following variables:

- A table presenting the estimated number of people living in areas located within the sound level ranges according to Table 4. Figures should be rounded up or down to the nearest hundredth.
- A table presenting areas exposed to noise as well as the estimated number of dwellings, schools and hospitals in these areas for the following L_{DEN} values: L_{DEN} > 55 dB(A), L_{DEN} > 65 dB(A), L_{DEN} > 75 dB(A). The figures for dwellings should be rounded up or down to the nearest hundredth.
- A table presenting the estimated number of cases of ischaemic heart disease, the estimated number of cases of high annoyance (HA) and the estimated number of cases of high sleep disturbance (HSD) in areas within the sound level ranges shown in Table 4.

Noise pollution is determined based on the sound level results calculated at the building facades (at a height of 4 m above ground).

A summary of the pollution and area statistics for the main federal railway lines of Berlin may be found here (only in German).

Note on the noise exposure figures presented in the Noise Mapping 2022 of Berlin:

Since 2022 (Level 4), all noise maps in the EU have been produced following new, uniform calculation methods to ensure that the results are comparable between the Member States. The new noise maps therefore cannot be compared with those of 2017 and before. A much higher number of people impacted by noise is now shown at many locations – even though the noise situation has not changed significantly in the meantime, or even though noise abatement measures have since been taken.

This is mainly due to the following reasons:

- Due to the new EU-wide standardised calculation method (CNOSSOS-EU), the mechanisms of noise generation in road, rail and air traffic have become much more detailed and complex in the modelling than in the previous provisional calculation methods of 2007/ 2012 and 2017. With this method, noise reductions are mapped in detail after measures within the framework of noise action planning, which may then contribute to improving the noise situation.

- The number of people exposed to noise is now determined differently. Previously, the inhabitants of residential buildings were evenly distributed across a building, across both the noisy and the quiet side. Now, however, all residents are assigned to the noisier front of the building; the quieter back is disregarded. Thus, a much higher number of people exposed to noise is reported.

- The sound level classes indicated here follow a new rounding rule. The classes based on 5 dB intervals were therefore reduced by 0.5 decibel each. As a result, larger areas and more people exposed to noise tend to be reported.

These factors combined influence the intensity of the population's exposure to noise as well as the number of people exposed in the Berlin conurbation. In particular, the switch from earlier calculation methods to procedures that are uniform throughout Europe means that the current noise mapping results cannot be compared with those of 2017 or only to a very limited extent. Even if the actual situation

did not change, a higher number of areas and a considerably higher number of people exposed to noise tend to be reported. The current noise maps therefore do not or only insufficiently reflect the effect of noise reduction measures that had been implemented in the meantime.

Road Traffic

Tables 5 - 8: People exposed to road traffic noise from all assessed roads:

Tab. 5: Number of people exposed in their homes to road traffic noise from all assessed roads (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)					
Level range L_{DEN} in dB(A)	55 to 59	60 to 64	65 to 69	70 to 74	from 75
Number of people	364,100	343,200	369,500	92,700	3,400

Tab. 5: Number of people exposed in their homes to road traffic noise from all assessed roads (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

Tab. 6: Number of people exposed in their homes to road traffic noise from all assessed roads (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)					
Level range L_{Night} in dB(A)	50 to 54	55 to 59	60 to 64	65 to 69	from 70
Number of people	350,600	370,500	206,500	13,700	600

Tab. 6: Number of people exposed in their homes to road traffic noise from all assessed roads (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)

Tab. 7: Plots of land, dwellings, and school and hospital buildings exposed to road traffic noise from all assessed roads (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)				
		Level range L_{DEN} in dB(A)		
		from 55	**from 65**	**from 75**
Area in km²		250	84	11
Number of dwellings		558,600	221,700	1,600
Number of school buildings		1.092	352	2
Number of hospital buildings		349	125	0

Tab. 7: Plots of land, dwellings, and school and hospital buildings exposed to road traffic noise from all roads assessed (as of Noise Mapping 2022)

All individual buildings of the schools and hospitals exposed to noise were included in the evaluation.

Tab. 8: Number of people exposed in their homes to road traffic noise from all assessed roads (in relation to the estimated cases of annoyance, sleep disturbance and ischaemic heart disease) (as of Noise Mapping 2022)	
Estimated number of cases:	
High annoyance	222,612
High sleep disturbance	81,011
Ischaemic heart disease	467

Tab. 8: Number of people exposed in their homes to road traffic noise from all assessed roads (in relation to the estimated cases of annoyance, sleep disturbance and ischaemic heart disease) (as of Noise Mapping 2022)

Tables 9 - 12: People exposed to main road traffic noise:

Tab. 9: Number of people exposed in their homes to main road traffic noise (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)					
Level range L_{DEN} in dB(A)	55 to 59	60 to 64	65 to 69	70 to 74	from 75
Number of people	290,400	235,000	321,300	86,400	3,300

Tab. 9: Number of people exposed in their homes to main road traffic noise (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

Tab. 10: Number of people exposed in their homes to main road traffic noise (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)					
Level range L_{Night} in dB(A)	50 to 54	55 to 59	60 to 64	65 to 69	from 70
Number of people	251,700	285,500	191,200	12,500	600

Tab. 10: Number of people exposed in their homes to main road traffic noise (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)

Tab. 11: Areas, dwellings, school and hospital buildings exposed to main road traffic noise (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)				
		Level range L_{DEN} in dB(A)		
		from 55	**from 65**	**from 75**
Area in km²		212	71	11
Number of dwellings		441,600	191,400	1,500
Number of school buildings		823	285	2
Number of hospital buildings		276	106	0

Tab. 11: Areas, dwellings, school and hospital buildings exposed to main road traffic noise (as of Noise Mapping 2022)

All individual buildings of the schools and hospitals exposed to noise were included in the evaluation.

Tab. 12: Number of people exposed in their homes to main road traffic noise (in relation to the estimated cases of annoyance, sleep disturbance and ischaemic heart disease) (as of Noise Mapping 2022)	
Estimated number of cases:	
High annoyance	179,227
High sleep disturbance	66,301
Ischaemic heart disease	378

Tab. 12: Number of people exposed in their homes to main road traffic noise (in relation to the estimated cases of annoyance, sleep disturbance and ischaemic heart disease) (as of Noise Mapping 2022)

Tram and Underground Traffic

Tab. 13: Number of people exposed in their homes to tram and underground noise (above-ground sections) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)					
Level range L_{DEN} in dB(A)	**55 to 59**	**60 to 64**	**65 to 69**	**70 to 74**	**from 75**
Number of people	76,900	39,100	15,100	600	0

Tab. 13: Number of people exposed in their homes to tram and underground noise (above-ground sections) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

Tab. 14: Number of people exposed in their homes to tram and underground noise (above-ground sections) (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)					
Level range L_{Night} in dB(A)	**50 to 54**	**55 to 59**	**60 to 64**	**65 to 69**	**from 70**
Number of people	56,700	22,500	5,200	0	0

Tab. 14: Number of people exposed in their homes to tram and underground noise (above-ground sections) (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)

Tab. 15: Plots of land, dwellings, and school and hospital buildings exposed to tram and underground noise (above-ground sections) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)				
		Level range L_{DEN} in dB(A)		
		from 55	**from 65**	**from 75**
Area in km²		17	2	0
Number of dwellings		62,700	7,500	0
Number of school buildings		103	17	0
Number of hospital buildings		39	5	0

Tab. 15: Plots of land, dwellings, and school and hospital buildings exposed to tram and underground noise (above-ground sections) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

All individual buildings of the schools and hospitals exposed to noise were included in the evaluation.

Tab. 16: Number of people exposed in their homes to tram and underground noise (above-ground sections) (in relation to the estimated cases of annoyance and sleep disturbance) (as of Noise Mapping 2022)	
Estimated number of cases:	
High annoyance	22,893
High sleep disturbance	11,962

Tab. 16: Number of people exposed in their homes to tram and underground noise (above-ground sections) (in relation to the estimated cases of annoyance and sleep disturbance) (as of Noise Mapping 2022)

IED Plants

Tab. 17: Number of people exposed in their homes to industrial and commercial noise (IED plants) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)					
Level range L_{DEN} in dB(A)	**55 to 59**	**60 to 64**	**65 to 69**	**70 to 74**	**from 75**
Number of people	600	100	0	0	0

Tab. 17: Number of people exposed in their homes to industrial and commercial noise (IED plants) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

Tab. 18: Number of people exposed in their homes to industrial and commercial noise (IED plants) (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)					
Level range L_{Night} in dB(A)	**50 to 54**	**55 to 59**	**60 to 64**	**65 to 69**	**from 70**
Number of people	0	0	0	0	0

Tab. 18: Number of people exposed in their homes to industrial and commercial noise (IED plants) (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)

Tab. 19: Plots of land, dwellings, and school and hospital buildings exposed to industrial and commercial noise (IED plants) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)				
		Level range L_{DEN} in dB(A)		
		from 55	**from 65**	**from 75**
Area in km²		2	1	0
Number of dwellings		400	0	0
Number of school buildings		2	0	0
Number of hospital buildings		1	0	0

Tab. 19: Plots of land, dwellings, and school and hospital buildings exposed to industrial and commercial noise (IED plants) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

All individual buildings of the schools and hospitals exposed to noise were included in the evaluation.

Air Traffic

The following evaluations were carried out according to the Environmental Noise Mapping of Berlin Brandenburg Airport (EDDB) (Wölfel 2022, only in German).

Berlin Brandenburg Airport (BER)

Tab. 20: Number of people exposed in their homes to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the noise index LDEN) (as of Noise Mapping 2022)					
Level range L_{DEN} in dB (A)	**55 to 59**	**60 to 64**	**65 to 69**	**70 to 74**	**from 75**
Number of people	8,300	60	0	0	0

Tab. 20: Number of people exposed in their homes to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

Tab. 21: Number of people exposed in their homes to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)					
Level range L_{Night} in dB (A)	**50 to 54**	**55 to 59**	**60 to 64**	**65 to 69**	**from 70**
Number of people	1,300	0	0	0	0

Tab. 21: Number of people exposed in their homes to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the noise index L_{Night}) (as of Noise Mapping 2022)

Tab. 22: Plots of land, dwellings, and school and hospital buildings exposed to aircraft noise from Berlin Brandenburg Airport (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)				
		Level range L_{DEN} in dB (A)		
		from 55	**from 65**	**from 75**
Area in km²		9	0	0
Number of dwellings		4,200	0	0
Number of school buildings		0	0	0
Number of hospital buildings		0	0	0

Tab. 22: Plots of land, dwellings, and school and hospital buildings exposed to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the noise index L_{DEN}) (as of Noise Mapping 2022)

Tab. 23: Number of people exposed in their homes to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the estimated cases of annoyance and sleep disturbance) (as of Noise Mapping 2022)	
Estimated number of cases:	
High annoyance	2,766
High sleep disturbance	279

Tab. 23: Number of people exposed in their homes to aircraft noise from Berlin Brandenburg Airport (BER) (in relation to the estimated cases of annoyance and sleep disturbance) (as of Noise Mapping 2022)

List of References of the Report and Additional Links

List of References of the Report

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