

06.06 Population Density (2018 Edition)

Overview

The term population density is a measure of how many people live in a given area. Population density as used here is the number of inhabitants per hectare (1 hectare is an area about 86 yards on a side. 1 hectare = 2.47 acres, or 1 acre = 0.4047 hectare. 640 acres = 1 sq. mile). The population density of Berlin's entire urban area is 37 people/hectare (p/ha). This figure is in the middle range for German and European cities. Hamburg has an average of 39 % fewer people per hectare. In the inner city of Paris, the population density on the same area is almost twice as high. As the city of Paris developed, however, within a limited area of around 105 km², these numbers are only somewhat comparable (cf. Fig. 1).

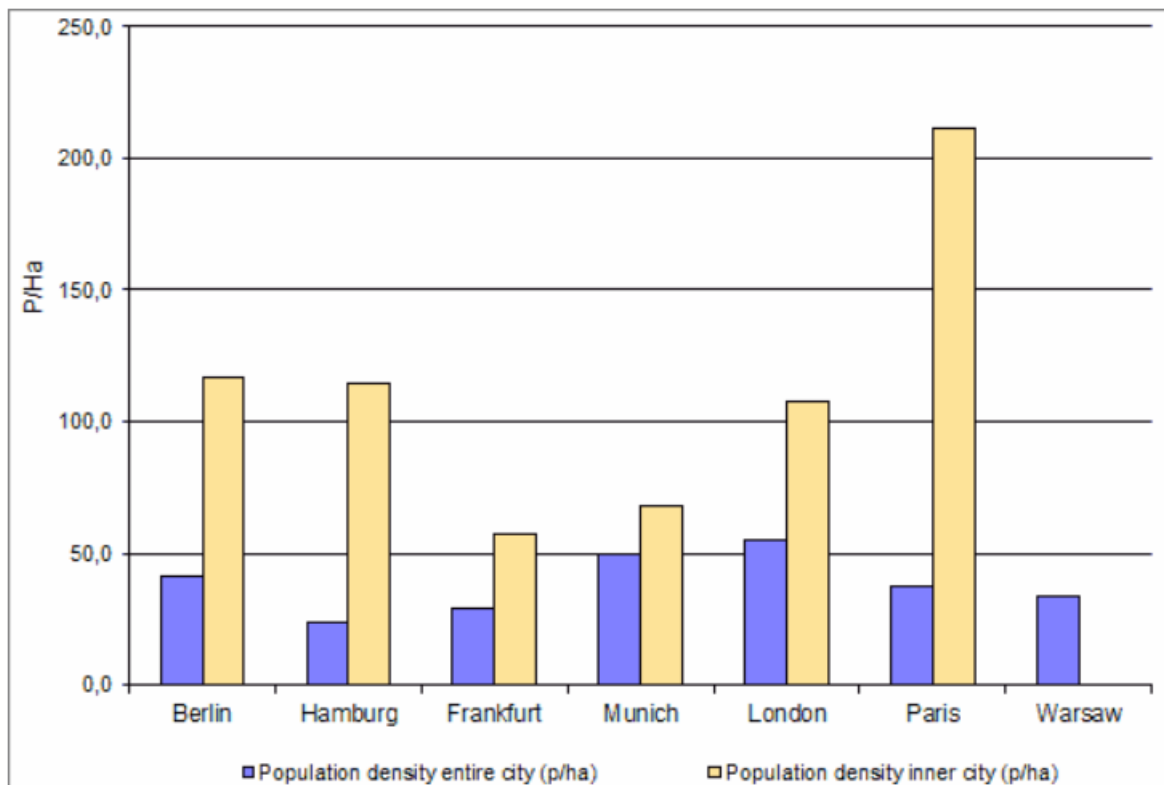


Fig. 1: Population density of Berlin compared to other cities, in people per hectare (data from 2013-2016)

Data status: Berlin / Munich: 31/12/2016; Hamburg / London: 31/12/2015; Frankfurt: 30/06/2016; Paris: Inner City, Unité urbaine: 01/01/2013; Warsaw: 30/06/2015. See notes on Fig. 2 for definition of Berlin inner city. In Paris, the inner city and the municipal border of the city area overlap. For comparison purposes with the other urban areas, the geographical unit "Unité urbaine", encompassing 10,601,122 inhabitants on 2,845 km², is used as a reference value for the entire city.

The population density of Berlin's inner-city, i.e. within the so-called City Rail Circle Line (S-Bahn-Ring), lies above average at 117 p/ha and even exceeds that of London.

The Map of Population Density depicts population density in terms of statistical blocks or block segments (cf. Methodology). Therefore, this presentation is directly comparable to the previous [edition from 2017](#).

High population density causes great environmental stresses, especially in close proximity to the road, such as noise and air pollution caused by traffic. Residents frequent public green areas for relaxation. These areas are, however, heavily visited, often overused, and loud. Private green areas exist only to a

limited extent. Some densely populated areas of Berlin are attractive residential areas in spite of this. Some block-style constructions from the Wilhelminian period are especially attractive when they have living quarters of generous size, and are complemented by a good infrastructure of small businesses, restaurants, cultural facilities, services, and an extensive public transportation system. Rich urban life flourishes here. This urbanity is missed by many living in the purely residential areas at the edge of the city. These areas have a relatively low population density, a high ratio of open space, and less air and noise pollution.

The inner city boroughs of Mitte, Tiergarten, Wedding, Prenzlauer Berg, Friedrichshain and Kreuzberg reached their greatest population density in 1910 with 312 p/ha. Today, the population density of these boroughs has dropped to 116 p/ha, one-third of the peak value (cf. Fig. 2).

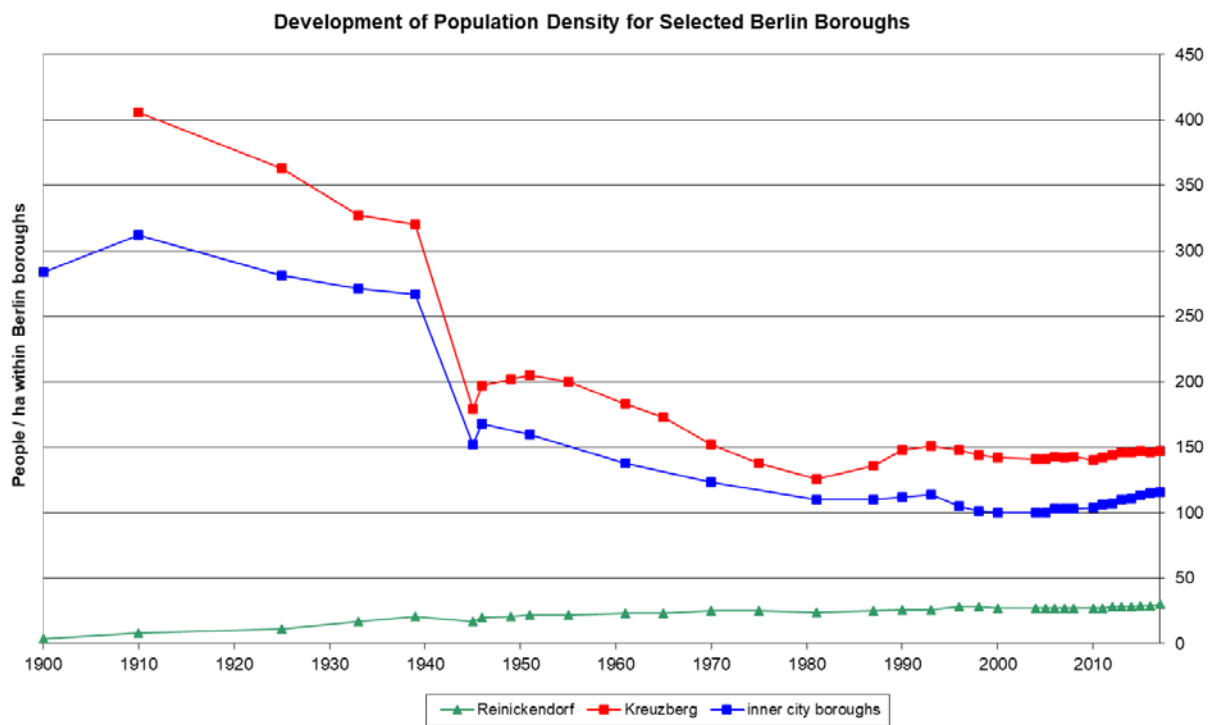


Fig. 2: Development of population density for selected Berlin boroughs (people/hectare within Berlin boroughs), as of December 31, 2017

For the years 1871 and 1900, only aggregated population numbers were available for the inner city boroughs. Between 1949 and 1975, no population data was available for the eastern city boroughs. Hence, the population density of the inner city boroughs could not be determined for these years.

In contrast, the population in the outer boroughs rose continuously, except for a general drop in 1945, caused by war-time conditions.

While in 1996 a continuous growth in population of up to 300,000 people was expected by 2010, a more complex development took place: After a peak in 1993 with nearly 3.48 Million inhabitants, the number decreased to 3.38 Million in 2000. Since then, the number has increased quite continuously to 3.71 Million inhabitants (relating to mandatorily registered residents who have stated Berlin to be their main place of residence, as of December 31, 2017, [Statistical Office of Berlin-Brandenburg](#), only in German).

Lower population density results not only from high proportions of green and open spaces and lesser degrees of development. Lower density can also be due to a large amount of small business, trade and service use, as well as public facilities, etc. These property areas are included in calculations of population density, as long as they are not separated in an own block segment.

Detailed and current data bases of population density in specific urban areas are useful for the planning of various public departments. The Department of Urban Planning, for example, uses these figures as a basis for planning such infrastructure facilities as schools, businesses and playgrounds. Landscape Planning uses these figures for analyzing the number and accessibility of green spaces

near to residential areas ([cf. Map 06.05](#), SenStadt 2017). Knowledge of population density also allows conclusions to be drawn regarding environmental stresses, such as calculating the number of persons exposed to road traffic noise in their dwellings as part of the analysis of the Strategic Noise Maps ([cf. Map 07.05](#), SenStadtUm 2017a).

Statistical Base

The present map is based on the file “Inhabitants Legally Registered at the Places of their Main Residence in Berlin”, as of December 31, 2017, of the Statistical Office of Berlin-Brandenburg. The statistical system of the Residents’ Registration Office evaluates the data on all legally registered residents. As state-specific statistics, they primarily serve to provide small-scale demographic data, and to certify foreign residents according to their citizenships. It supplements the Official Population Extrapolation, which was provided with an updated statistical base with the 2011 Census (valid as of May 9, 2011), and is used primarily for statistical purposes, for instance to calculate the size of the federal-state revenue equalization. However, due to the different systems they use, there are deviations between the statistics of the Residents’ Registration Office (as of December 31, 2017: 3,711,629) and those of the Official Population Extrapolation (as of December 31, 2016: 3,669,025).

The latter is continued biannually on the basis of census data and of new registrations/ de-registrations).

As an administrative register, the Residents’ Registration Office cannot fully meet the precision requirements necessary for statistical accuracy. Thus, for example, the correction to account for registration deadlines with regard to residents’ moves, births or deaths currently still involves inevitable imprecision.

As a result of the issuance of uniform tax ID numbers, a particularly large number of foreigners who were no longer present at their legally registered addresses have been officially removed from the registry. The current results are therefore only comparable to a limited degree to those of previous years.

For the present map, all of the 393,000 Berlin address data as of December 31, 2017 was assigned to the block and block segment areas of the land-use file of the Urban and Environmental Information System (ISU), ISU 2015. That made it possible to aggregate resident data not only at the level of statistical blocks, but also at that of the so-called block segments of the ISU. The current presentation for the reference period December 31, 2017 can only be directly compared with the previous year ([cf. 2017 Edition](#), SenStadtUm 2017b), since the population data of December 31, 2016 was the first to be based on the block and block segments map ISU5, as of December 31, 2015 (cf. also Chapter “Population density development between 2016 and 2017”).

Several factors that influence the precision of the data stock presented:

- For reasons of statistical confidentiality, cases with only one or two examples may not be presented with their real values. Therefore, in the case of block and block segment evaluations, these confidential cases (values “1” or “2”) are changed in such a way that they occur either at least three times or not at all. For this reason, no absolute resident values of less than “3” occur.
- Combinations of characteristics with an occurrence of “1” or “2” are reassigned in such a way that ultimately, only combinations are present which occur either not at all or at least three times. The automatic confidentiality procedure used can not only prevent table values of less than “3” from occurring, but can also ensure that all evaluations lead to identical marginal total results. This procedure, optimized for both such issues, means that distortions are inevitable even for more frequently occurring fields in the table.
- Moreover, the administrative register cannot completely fulfill the precision requirements for statistics of a population register. For instance, the deadline date excerpt contains listings of noncurrent residents and cases of non-registration of actual residents, due to moves, births and deaths.

These limitations have to be taken into account when interpreting the figures.

The sizes of the particular blocks and block segments have been calculated directly from the block map ISU5 1:5,000, as of December 31, 2015.

Methodology

The spatial reference system was provided by the digital block map 1:5,000 (ISU5), as of December 31, 2015. This working map contains the individual statistical blocks. Blocks with more than one use are divided into block segments. The numbering and street limit lines of blocks correspond to those used by the Statistical Office of Berlin-Brandenburg.

The population density, the quotient of the number of inhabitants by the area size, was determined for each reference area. The size of each statistical block, needed for the calculation of population density, was calculated using the ISU5 1:5,000 equal-area map. Figures for the number of inhabitants were assigned to statistical blocks and block segments according to the ISU spatial reference system.

Map Description

Berlin is characterized by a grown multi central structure with two main centers beside the specific district centers: the areas "Zoologischer Garten" and "Mitte".

As a rule, population density increases from the city edge toward the city center, however, there are some focal points in the borough centers like Spandau, Tegel and Köpenick. Particularly the region of the central area Mitte, i.e. the area around the eastern Tiergarten and in the north and south of the boulevard Unter den Linden, is predominantly formed by its functions as the governmental area and as a supra regional and significant center for services and commerce. Today, only some blocks remain with more than 70 p/ha. Leipziger Straße and the new residence units on Wilhelmstraße are densely populated and are conspicuous exceptions to general conditions in the eastern city center.

In contrast, the second important city center, located around the Zoologischer Garten and along the Kurfürstendamm, has been preserved largely as a residential area, contributing significantly to the liveliness of the cityscape. Here, a considerable number of blocks still count more than 150-200 p/ha.

The Wilhelminische Ring stands out with a predominately high population density of 351 and more p/ha. The area has a block structure from the Wilhelminian period and is located within and on the edge of the City Rail Circle Line. Maximum values with more than 700 p/ha occur only in about 50 of the overall 14,900 blocks and block segments in Berlin. These areas are predominantly located in the boroughs of Neukölln, Kreuzberg and Lichtenberg.

Outside the City Rail Circle Line, the relatively high population density continues south into the Schöneberg, Friedenau, and Steglitz boroughs. A population distribution similar to that within the inner City Rail Circle Line is found in older development areas of Spandau, and is similar to areas such as Tegel, Schöneweide, Adlershof, and Tempelhof, which were developed around the turn of the century, then on the edge of Berlin.

The high-rise and industrially-prefabricated settlements at the edge of the city are relatively densely populated with 151 to more than 350 p/ha in large block areas. These are Märkisches Viertel, Hohenschönhausen, Marzahn, Hellersdorf, and Gropiusstadt.

Smaller settlements in Spandau, Lichterfelde, Marienfelde, Waidmannslust, Bohnsdorf and Köpenick, with their post-war high-rise development, stand out with predominantly 151 to 250 p/ha in the generally more sparsely populated city edges. Some locations in this population density class are settlements with block-edge and row development, however. Examples are Haselhorst, Siemensstadt, Zehlendorf, and Plänterwald.

Typical for the city edge, and the most numerous, are relatively thinly populated settlements with 5 to 70 p/ha. These blocks are mainly characterized by structure type 10 ("Low buildings with yards"), extending along the city boundary like a ribbon, excluding undeveloped forest areas or areas of other green uses.

Compared with the [Population Density map of 1994](#) (SenStadtUmTech 1996), an interesting development can be observed at the eastern city border today, almost 25 years later. Because of divisions of real estates in the areas of Biesdorf/Mahlsdorf/Kaulsdorf and in the consequence constructional compressions, the predominant number of blocks are nowadays in the density category of 31-70 p/ha, whereas for the data from December 31, 1994 blocks with less than 30 p/ha are in the majority. Therefore, the eastern border of Berlin is now generally no longer characterized by a lower population density than the western border.

The distribution of population density correlates quite clearly with the [Environmental Atlas Map Urban Structure \(06.07\)](#) (SenStadt 2016). It is apparent that area types can be assigned a certain range of population density. Table 1 shows the average population density for the individual area types with

predominantly residential use (share > 75 %) or a share of trade, services and commerce fluctuating between 25-50 %. These calculations apply to areas, both blocks and block segments, of uniform use.

Tab. 1: Average Population Density per Area Type and Use, as of December 31, 2017		
Area Type	Average Population Density (p/ha) per Use	
	Residential Area	Mixed Area I
Dense block development, closed rear courtyard (1870s - 1918), 5 - 6-storey	536	390
Closed block development, rear courtyard (1870s - 1918), 5-storey	418	281
Closed and semi-open block development, decorative and garden courtyard (1870s - 1918), 4-storey	261	199
Mixed development, semi-open and open shed courtyard, 2 - 4-storey	154	154
De-cored block-edge development, post-war gap closure	332	237
Heterogeneous inner-city mixed development, post-war gap closure	240	234
Block-edge development with large quadrangles (1920s - 1940s), 2 - 5-storey	252	197
Parallel row buildings with architectural green strips (1920s - 1930s), 2 - 5-storey	185	215
Free row development, landscaped residential greenery (1950s - 1970s), 2 - 6-storey	157	133
Large estate with tower high-rise buildings (1960s - 1990s), 4 - 11-storey and more	272	256
Rental-flat buildings of the 1990s and later	200	114
Row houses and duplex with yards	63	53
Detached single-family homes with yards	40	36
Villas and town villas with park-like gardens (mostly 1870s - 1945)	52	45
Densification in single-family home area, mixed development with yard and semi-private greening (1870s to present)	79	73
Village-like mixed development	35	25
Non-residential mixed use area, dense development		147
Non-residential mixed use area, sparse development		77

Tab. 1: Average population density per area type and use, as of December 31, 2017

For blocks which are used for multiple purposes, the population density can be displayed with relatively high precision in reference to block segments with uniform use. Instancing the block north of the Innsbrucker Platz between Belziger Straße / Dominicusstraße and Eisenacher Straße has several block segments, including a cemetery of 1.8 ha and a park of 2.5 ha. By transferring the population data to the remaining segments of the block, the population density of 88 p/ha recorded for the entire block in 1994 increased to 340 p/ha in 2017, thus displaying a much more accurate picture of the situation.

Nevertheless, there are also undivided blocks with different uses, for all cases where these differing uses do not reach a size of one ha. For example, the western part of the block at the corner of Gothaer Str. and Belziger Str. also has a larger utilities area, which was not indicated separately. In light of its inner city location, with only 177 p/ha, it is a rather sparsely populated block. Further blocks with similar population numbers are assigned to the use category "Public service and other special uses".

Population density development between 2016 and 2017

The population growth Berlin has seen over the last few years has led to a substantial increase in the number of inhabitants within the state. According to the population register, 3,711,629 people were recorded on December 31, 2017; thus exceeding the previous year's population count by approx. 42,000 people. Overall, most of the inhabited blocks (approx. 14,900 in total) were affected by population changes, compared with the previous year. Relevant changes, both in terms of increased and decreased population values, were observed in about 1,250 blocks and block segment areas (see this [PDF file](#) for further details).

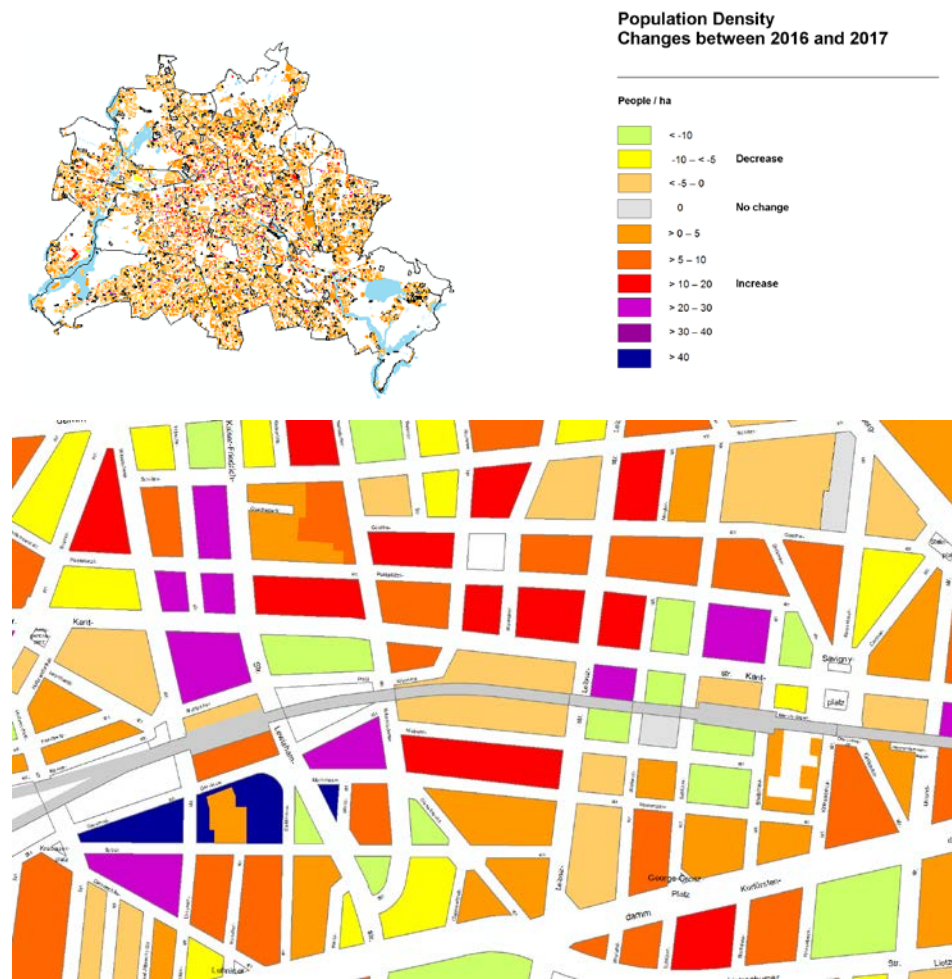


Fig. 3: Map of Changes in Population Density between 2016 and 2017 (see this [PDF file](#) for further details).

Areas displaying more substantial changes in population density (p/ha) within the year – increases of more than 20 p/ha or decreases of more than 10 p/ha – are not distributed evenly across the individual districts or even the whole city. The inner city area (the environmental zone within the City Rail Circle Line), however, was identified as a key area:

- A total of 711 blocks or block segment areas saw an increase in population density of more than 20 p/ha. A disproportionately high 35 % (251) of those is located within the area of the City Rail Circle Line, which only accounts for about 11 % of the total city area.
- Also located within the area of the City Rail Circle Line is a large share (~40%, 214 of 531 areas) of the blocks / block segment areas whose population density decreased considerably (by more than 10 p/ha each).

Figure 4 illustrates how the affected blocks and block segment areas are distributed across this region.

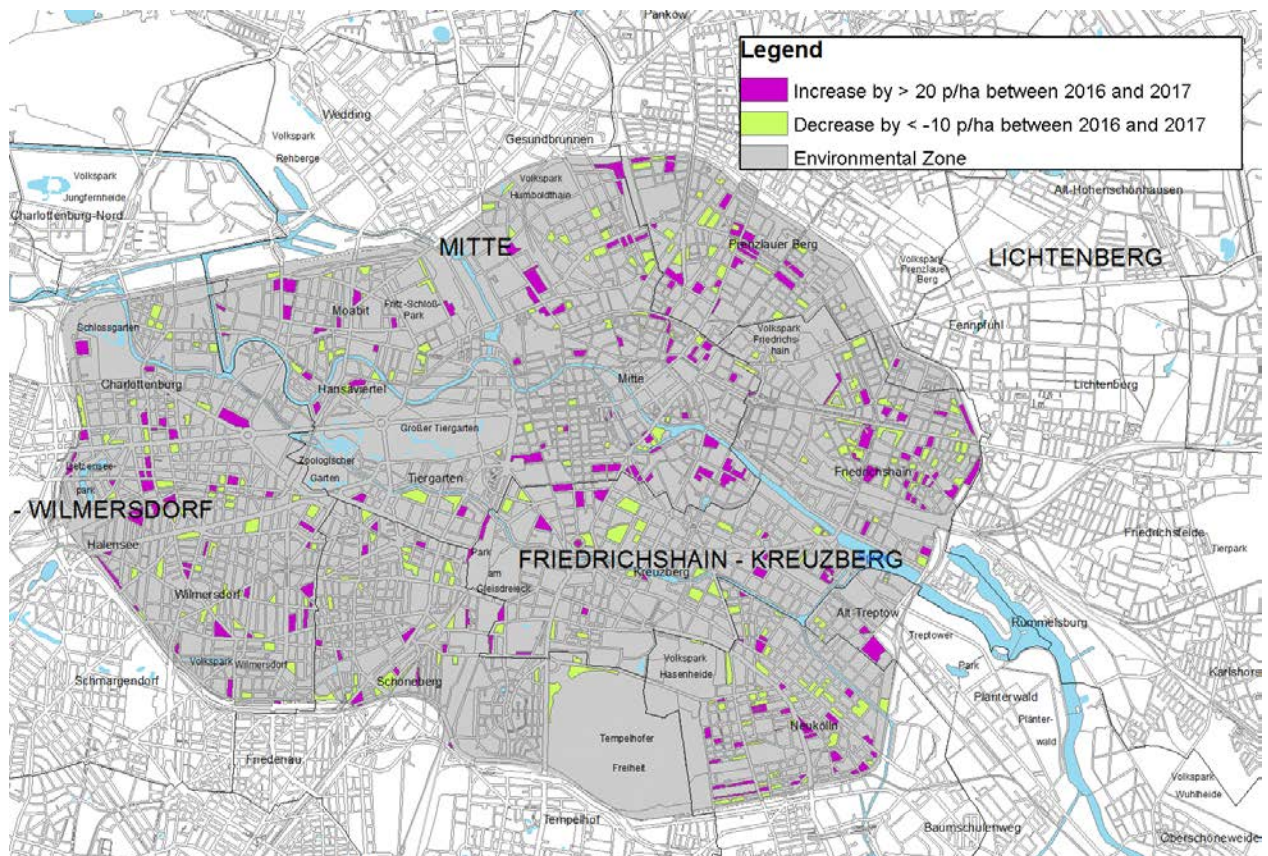


Fig. 4: Increase and decrease in population per hectare between December 31, 2016 and December 31, 2017 within the City Rail Circle Line area (data sources: "Inhabitants Legally Registered at the Places of their Main Residence in Berlin", as of December 31, 2017, Statistical Office of Berlin-Brandenburg)

Blocks with above-average population increases and decreases appear clustered at times. What caused these drastic changes within the period of one year could not be determined in detail. Thus, converting buildings from residential to commercial use may lead to population reductions locally, in the same way that new constructions may increase population numbers, due to gap closures and densification within existing developments.

In the outskirts of the city, new construction activity across the entire block plays an important role, leading to considerable population increases, even in as short a period as one year. This is exemplified by the residential construction projects: "*Wohnen am Campus I & II im Bereich der Wissenschaftsstadt Adlershof*" (Living on campus I & II around the "science city" of Adlershof).

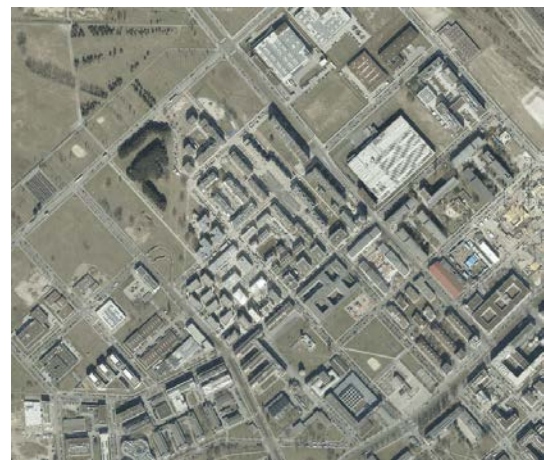


Fig. 5: Increase in population density (p/ha) by more than 40 people between 2016 and 2017 following new construction activity around the “science city” of Adlershof (“Wohnen am Campus I & II”), top: map section (for legend, see Fig. 3), bottom left: section from orthophoto 2016 (DOP 2016), bottom right: section from orthophoto 2017 (DOP 2017), Source of orthophotos: Geoportal Berlin ([FIS Broker](#))

Changes should generally be mapped and studied over a longer period of time. For this purpose, the developments shall be continually recorded and updated here, while annually comparing them to the reference year (2016).

Literature

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Links (Data Sources, Figure 1)

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- [6] **Stadt Warschau [City of Warsaw]**
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- [7] **Statistisches Amt für Hamburg und Schleswig Holstein [Statistical Office of Hamburg and Schleswig-Holstein]**
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Maps

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