QUANTITATIVE AND QUALITATIVE RESEARCH IN HOUSING AREAS: CONTEMPORARY HOUSING DEVELOPMENTS IN SILESIAN METROPOLITAN AREA, POLAND

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ABSTRACT

Between 2000 and 2010 housing development in Poland changed dramatically. Increasing demand for houses and flats caused growth in the construction sector which resulted in many new housing realizations. Years of real socialism and central planning distorted the concept of a housing estate and that is why demand for single-family houses increased relatively more than housing demand in general. According to that demand local development plans eased large rural areas on the outskirts of most cities for single-family housing. As a result, there are many new low-density housing estates and very few high-density estates within city centres. The paper refers to a research method that has been developed to measure and compare various housing developments in Poland. The method can be used to show both density indicators and a general overview of different cases. The research presented in the article, based upon the developed method, was conducted in the Silesian Metropolitan Area.

Keywords: Housing density, Sustainable neighbourhood, Silesian Metropolitan Area

INTRODUCTION

Housing development must be conducted with respect to sustainable urban design, since areas dedicated for housing are the largest parts of cities (O'Leary 2003: 151; Levy, 2006: 188). Contemporary urban planning in Poland faces several different problems with housing developments such as; suburbanization, sustainability issues, low design and realisation quality. They are all connected with various factors like local and construction law, local traditions, real estate market, wealth level and others. In fact many of the existing publications regarding qualitative and quantitative research on housing are being conducted in the field of economy. As Horseword (2011) states there is a fundamental difference between both approaches: in quantitative approach numerical values need to be collected to enable statistical analysis while in qualitative data collection the analysis requires the information to be collected in non-numeric form. However, that does not necessarily occur in the field of urban design, where quantitative issues may represent qualitative values.

Most of the contemporary publications on housing estates show great interest in density, as it is one of the most important issues for urban planning. One of the more interesting exercises focused on density issues are "Farmax" by MVRDV, "Density" series by A+T edition and "Spacemate" by Permeta Architecten. "Farmax" (Koek, 2006) is an overall presentation of urban densities from all over the world showing how far the FAR (Floor Area Ratio) may be pushed and what the limits are. "Density" series (Mozas and Fernandez, 2006) show a selection of various examples of European housing estates presented in a catalogue in a graphic manner that allows to make a comparative analysis. "Spacemate" is an online calculator (Meta, 2004), a tool for density comparisons, which can be used in the quantitative approach. The calculator allows to illustrate different combinations of estates' parameters, such as density, FAR and site area. A lot of presented examples showed that similar parameters could be achieved through different patterns and various housing typologies, which can and should be used in urban planning. These publications seem to be very helpful in quantitative urban analyses and architectural researches, however they do not show the wider urban perspective.

In Poland, after the transformation in 1989 and even more after year 2000, due to economic growth, housing development, and with it land demand increased significantly. Before 2000 less than 0.8% of the total number of flats were newly built and later (2004-2008) it became more than 1.2%, while 20% of the total residential growth was in the Silesian Metropolitan Area. This led to many controversial decisions, which released large areas of land for housing. New estates were often constructed without the necessary services and appropriate roads. Since there are no housing standards in Poland (the last valid set of standards was withdrawn in

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1981), a vast part of new housing estates were of low quality and were located on the cheapest land - on the city outskirts, with no connection to the existing social nor technical infrastructure. That fits the broader image presented in the EU housing report (The Hague: Ministry of Interior and Kingdom Relations, 2010) which stated that the growth of built-up areas has been expanding much faster than the population growth.

In 2003 a new planning law in Poland was adopted. Then on obligatory development frameworks and local development plans were to be prepared. Unfortunately new developments, even when built after 2003, are of diversified quality. Many of them were designed before proper LDPs were prepared, or according to LDPs which were created with very few restrictions, based on a false conviction that free market can regulate the quality itself. A lot of new housing developments represent the quantitative approach, as they were built with the low quality with maximum density approach.

Urban indicators, such as housing density, number of floors, car park ratio should be set in LDPs and thus they would limit the urban form. However, as far as LDPs are not precise masterplans (showing precise layout with all urban indicators specified in detail) it is still common that housing estates are being built with minimum standards. According to the obligatory Planning System in Poland, quality issues in urban design may not be major drivers determining the final site layout. Housing Quality Indicators (HQI) focus on housing usability and performance (Imbrie, 2006). It is a measurement and assessment tool for housing schemes. Although the HQI is not being used, some of the obligatory regulations (building standards in Poland) meet the HQIs criteria. Nevertheless, the major HQIs criterion is location, which plays a major role for high quality housing.

For housing estates sustainability does not only mean energy efficiency but also balanced (sustainable) local communities. For ages, till the 19th century, people lived where they worked and shared the public realm (Talen, 2008). Nowadays, when places of work and living are often separated, a good transport system is crucial, and no housing development should be constructed without it. Sustainability also stands for social diversity and good neighbourhood can only be achieved with a mix of people of different ages, wealth and needs (Drury, 2008: 59-70). However, this target is hard to achieve if proper policies are not implemented (Broomfield and Drury, 2009). The most developed social policies can be observed in the UK (affordable housing system) and in France (HLM: "Habitation à Loyer Modéré", meaning "housing at moderated rents"). In some cases new developments are allowed on the condition that a part of each scheme is dedicated for the affordable housing scheme. There is also great care for diversification of flat sizes and tenure mix.

Since the housing sustainable development theory is quite well described in the European and Northern American context, and there are quite a lot of ideas on how to implement the concept of sustainable development (e.g.: Compact City, Traditional Neighbourhood Development, Transit – Oriented Development, New Urbanism, Smart Growth, La Nouvellle Charte d'Athens, Urban Village, Urban Renaissance, etc.) there was a need to check why the new Polish housing development is considered to be of low quality, whether is it a matter of subjective evaluation due to lack of actual research, or is it a matter of fact.

RESEARCH

The Silesian Metropolitan Area has been chosen for the research. It covers an area of 1218 sq km with over 2 million inhabitants. It is an industrial site, which generates more GDP than any other industrial region in Poland. It has a unique location as two most important European corridors A1 and A4 cross here. The region is still in transition from the Industrial Era to Post-industrial and Entrepreneurial Era. Silesia is one of the densest areas as the population reaches 1640 persons per hectare, which is one of the highest values in Poland and relatively high compared to Europe (the average is 166 persons per ha). Compared with several most important industrial areas in Europe, e.g. Ruhr and Randstadt, since the year 2000 many new developments have taken place and many of them are new housing estates. 41 different localisations were chosen for case studies, among them single and multifamily housing estates from 14 different cities from all over the Silesian Metropolitan Area (SMA) were chosen. The location of SMA, its structure and housing areas are presented here (Figures 1-3). The selection criteria was as follows: built after 2000, relatively dense site use (depending on typology, not to be understood as only a high density case), extraordinary values (to show that some cases may pretend to be ordinary buildings, but still some of the aspects or values may not be standard ones).

Research methodology was developed to present both sustainability and density issues of housing. The following research methods were used: general research about recent developments, observation, research on site and measurement (satellite aerial photos were used) and maps from local GIS systems. Polish cities share some of the data, such as plot

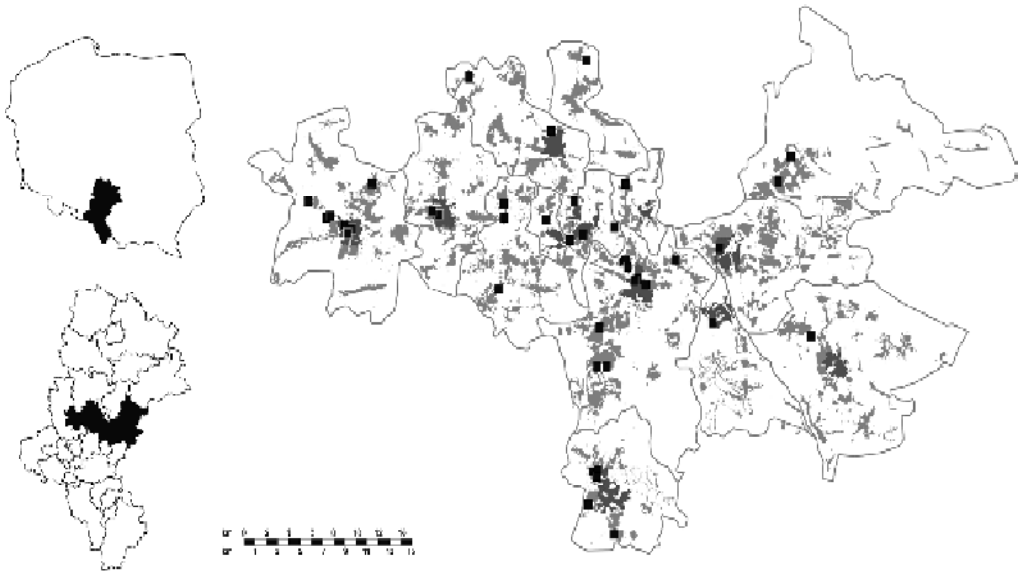


Figure-1: Silesian Metropolitan Area, Silesian Voivodship, Poland

	Total Area in km2	No. of Inhabitants (thousands)	Density (No. of Inhabitants Per Ha)	Number of Inhabitants Per Unit	Number of Units	Number of Units Per Ha	Total Number of Units	Number of Rooms	Average No. of Rooms Per Unit	Average Unit Floor Area	Average Area Per Unit Per Person
SMA (GZM)	1218	1990	**1634**	2,57	775826	**63,7**	43692521	2533541	3,27	56,32	21,96
Cracov (KOM)	3630	1340	369	2,8	478141	13,17	32407320	1693705	3,54	67,78	24,18
Warsaw(WOM)	6205	2941	474	2,45	1200666	19,35	7695562	4055411	3,38	64,1	26,1
Breclav (WrOM)	6725	1061	158	2,56	415182	6,17	27771244	1496007	3,6	66,89	26,17
Łódź (ŁOM)	2799	1129	403	2,37	475719	17	27312222	1526077	3,21	57,41	24,19

Figure-2: Silesian Metropolitan Area (SMA; GZM - Polish abbreviation) and other metropolitan areas in Poland - a comparison: data from 2006

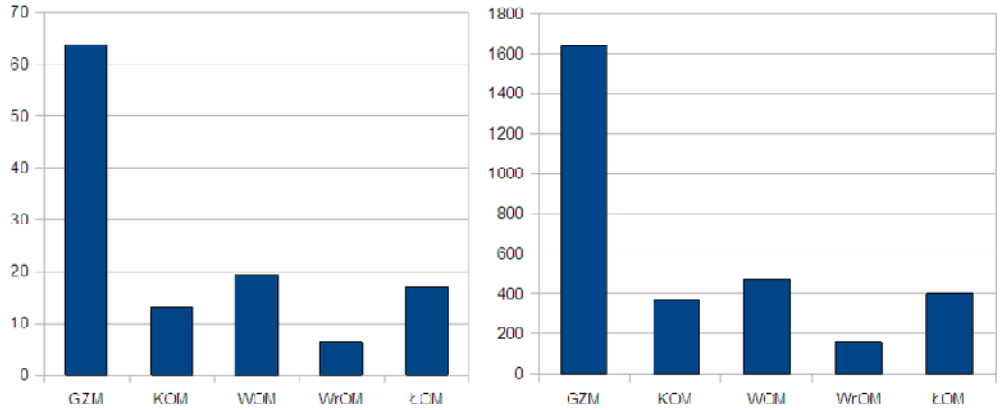


Figure-3: Housing density in metropolitan areas in Poland (SMA= GZM and other); left: number of units per ha, right: number of inhabitants per km^2

layouts, via web systems). Most of the collected data was set in a standardized layout with various parameters.

All case studies were assigned to one of three types of locations inner city and city centre, the adjacent city area and the outer city/ suburbs. The classification was similar to Gehl and Gemzoe, 1996. Three types of occupancy (private, housing association realisations[1] and social housing) were shortlised. For each case, images are presented to show how the place looks like (especially in order to allow visualisation of specific parameters with specific examples), and also general plans, to show how the site and the area are connected with the neighbourhood and how they are being used (Figures 4, 5).

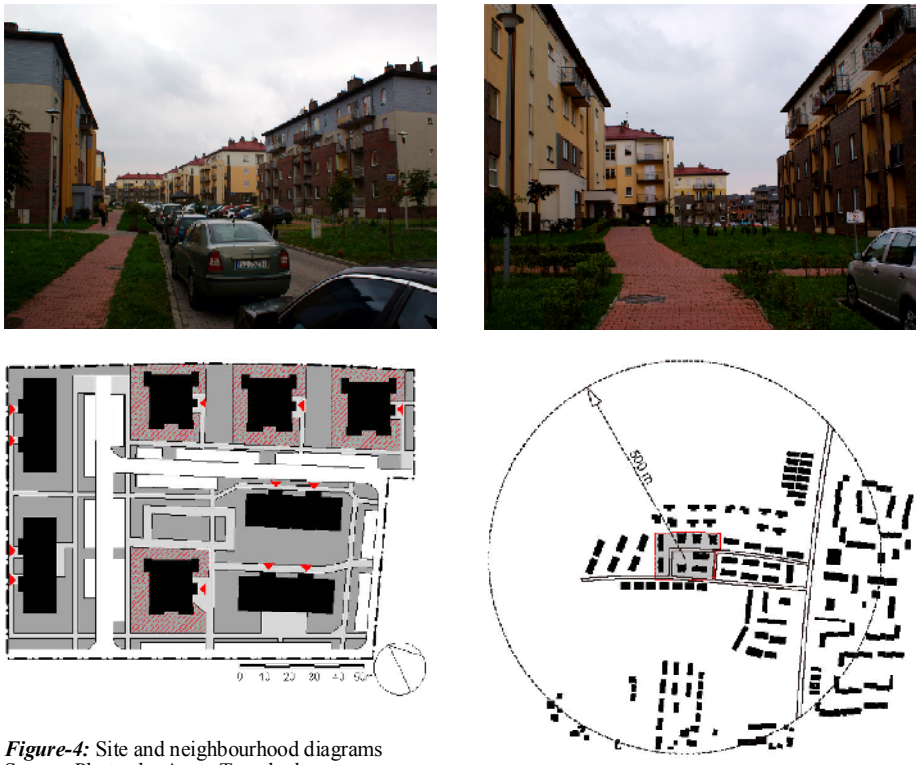


Figure-4: Site and neighbourhood diagrams
Source: Photos by Agata Twardoch

Site area [m²/ha]	18 300/1,8	100%	Number of commercial uses around the neighbourhood	0
Built-up area [m²/ha]	3 760/0,37	20,5%	Number of commercial use per ha	0
Green area	7 700/0,7	42%	Number of commercial use per flat	0
Circulation area	3 890/0,39	21,3%	Distance to the next bus stop [m]	500
Other use area	2 800/0,28	15,3%	Distance to the next commercial use [m]	300
No. of floors	4		Distance to the next social use [m]	600
Site use	0,2		Number of trees at site	0
Density ratio	0,82		Environmental systems	-
No. of flats	156		Safety issues of landscape	-
Density [units per hectare]	86		Mix of flats' size	+
Parking spaces (ground-level/under croft)	117/0		Mix of tenures	-
Parking spaces (common/private)	117/0		Playgrounds for children	-
No. of parking spaces per flat	0,75		Accessibility for the disabled	-

Figure-5: Standardized layout for housing case studies

1 Affordable sector, the system is similar to HLM.

Some of the parameters used in Figure 5 have been described in detailed here: site area, built-up area, car parking area, green area and other. These values presented in percentage terms illustrate how the site is used.

- Site area is measured as plot area
- Built-up area is measured as area covered by buildings
- Green area covered by greenery: trees, lawns, bushes etc.
- Circulation area – area reserved for vehicle circulation mainly roads, car parks
- Other use area are the paths, squares, pedestrian areas
- Site use is the part of the site that is used by buildings (built-up area divided by site area)

Density ratio shows the use of space on the plot (built-up area x the number of floors/ site area). Density shows the number of flats per hectare - this indicator shows the value, which determines whether it is low (0-40 f/ha), medium (40-90 f/ha) or high (90 and more f/ha) (Mozas and Fernandes, 2006). Density varies from one location to another, depending on local climate conditions and building regulations. Other indicators, such as the number of parking spaces per flat, show how the development responds to the location's needs. Also, the distance to a bus stop as well as the distance to commercial services such as shops, or social services such as school and healthcare centres play a major role for vehicle circulation and use of public transport. Mix of flat floor areas and mix of tenures are indicators showing whether social balance can be achieved. Playgrounds for children or accessibility for the disabled are general indicators which show whether the landscape design on the plot was realized or not (according to the building law in Poland both features should be included).

All the values and indicators have been arranged to describe the built-up area as well as its neighbourhood. Some indicators that were used, such as proximity to commercial services (e.g. shops) or a bus stop, show the location's potential. According to the planning system in Poland local development frameworks may limit development with all possible urban factors, listed above. Nevertheless this research showed that in most cases the factors were either not used or not precise, which allowed various realizations.

RESEARCH RESULTS

According to the planning system in Poland each community is obliged to prepare a proper LDP (Local Development Plan). The most unexpected result was the fact that majority (65%) of the new built housing estates were planned on the basis of special planning permits (granted for the purpose of particular investments) and were not planned according to the binding Local Development Plan. This means that even though the new planning system was engaged in 2003, the new LDPs were not prepared to allow more precisely, planned site use and it lead to lowering the housing standards. The results showed some unexpected values in a few case studies and it turned out that such research was essential to present contemporary practice. Site use showed that in some cases there is less than 20% of the green area, and in most cases the parking space and circulation area takes up most of the site (Figure 6).

The number of trees was a surprising result in most of the case studies. Most of the trees had originally been growing there, while only few were planted. 11 cases (26%) showed that there were no trees on the site at all (Figure 7). Very few of the studied cases represented attractive greenery and site landscape layout (Figure 8). Also, very few cases had playgrounds, even though building law states that this is obligatory.

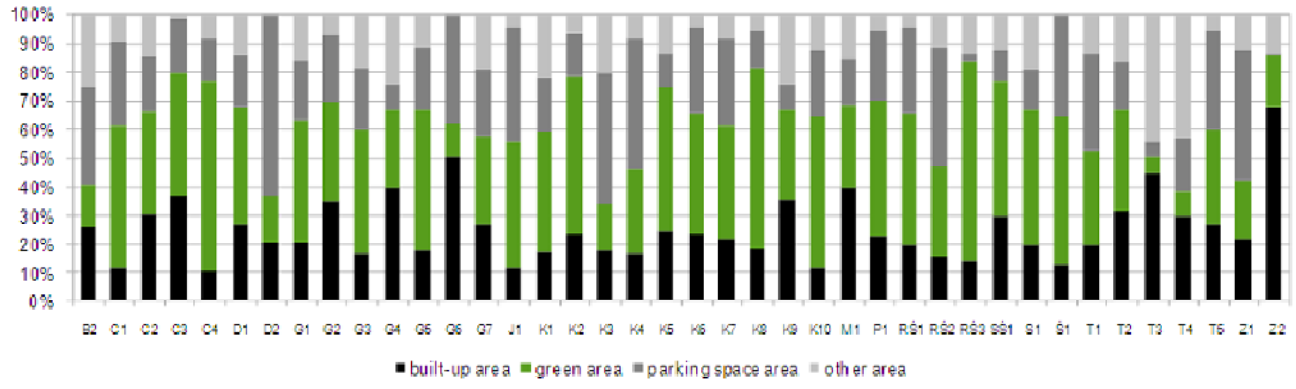


Figure-6: Site use graph

Figure-7: Bad example: low quality of landscape, no trees or plants (B2, Bytom, Sandomierska Street, Wesoa Street)

Figure-8: Good example: high quality of greenery in every suitable area (T2, Barona Bacha Street, Tychy)

Figure-9: Bad example: (G6, Gliwice, Wieczorka Street). A garage door on the ground floor in the city centre

Figure-10: Good example: undercroft car park and maximum density (Z2, Zabrze, Urbana Street)

The research on the number of car parks showed that even though the standard for developing countries would be more than one car park per flat, it is still common that this indicator is lower, especially in city centres. Observation showed that in most areas there was too little parking space (Figure 9). The issue of the parking spaces per flat ratio needs to be considered, many cases showed that a large part of the land is used for circulation and car parks. These facts stand in opposition to sustainable development. Only 34% of the studied cases had an undercroft car park (Figure 10).

The research on density showed that in some cases single-family housing may provide comparable density to multifamily housing (Figure 11). The research also showed that the number of floors does not always provide high density (Figure 12).

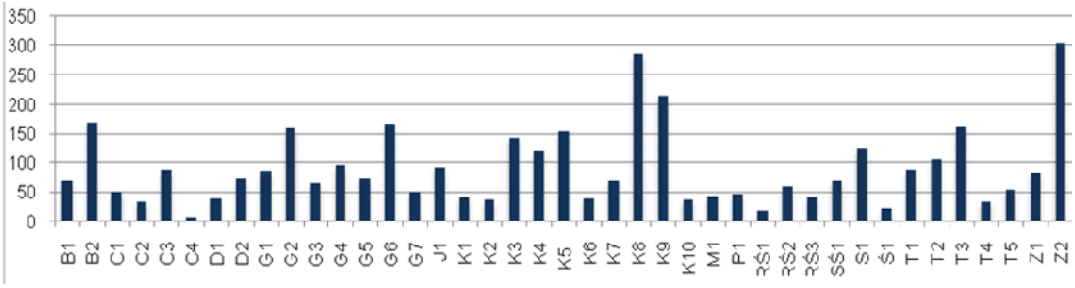


Figure-11: Number of flats per hectare in each case study

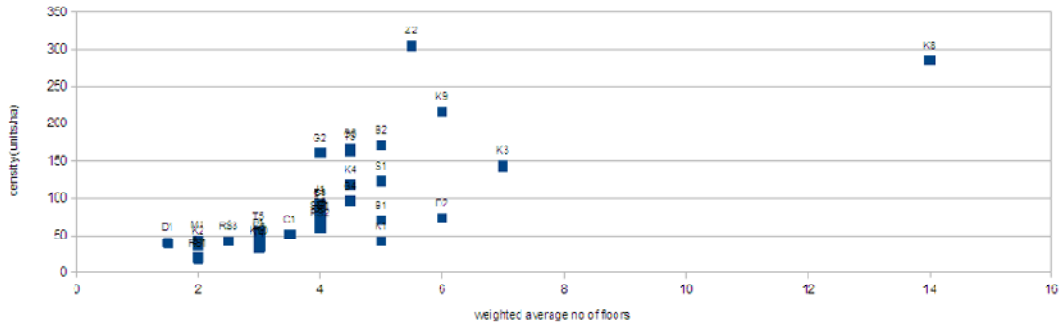


Figure-12: Density and weighted average number of floors graph

Figure-13: Good example - high density (av. 90 units per ha) and low number of floors (4) (G3 –Graniczna/Strzelnicza Street, Gliwice).

Figure-14: Good example - high density (av. 220 units per ha) and high number of floors (4-7) (K9: Katowice, S³awka Street)

The research also showed that environmental issues in the housing sector in Poland still remain relatively unimportant. In an evaluation of environmental systems, exterior solar shades (cool in summer, and warm in winter) were enough to get a positive mark, but still very few buildings had them. Other energy saving systems have not been observed (Figures 13,14).

In very few of the studied areas was there a mix of tenures. Most cases were commercial developments for sale (private) with one type of flat volumes. This often resulted in homogenous neighbourhoods with inhabitants of similar wealth, age and needs. The share of affordable housing in the housing market in Poland is very little compared to other countries (France 16%, UK 18%[2]) (Barker, 2006).

Only 29% of the studied cases had commercial services for rent. This does not meet the idea of mix of use, in some cases the distance to the closest shop was too long to walk and so sustainability was not achievable.

Some of the cases were gated estates some of them covered large areas fenced around with an entrance only from one or two sides. Often the contrast between inner and outer area was huge with high quality landscape inside and pavement holes with litter outside. This deepened social gaps and created unsafe areas in the cities. In case study for Debowe Tarasy estate, it took 10-minutes walk to encircle the entire site, and it did not help the inhabitants in the near neighbourhood since access to local shops was much more difficult than before.

CONCLUSIONS

Although many features of urban layout may be quantified or described by factors and ratios, observation of selected sites also provoked comments and provided conclusions. The research showed that in many fields new plans and realizations do not meet the European spatial development perspective. Housing quality assessment (partially the subject of the research) needed to be performed and it should be obligatory to improve the housing quality in Poland.

The more densely developed land is, the less need for transport. Several different studies, following various approaches, were carried out. Barret (Jenks et al, 1996) showed that the average distance that people travel depends on density. Accessibility to different means of transport and access to public transport may lower the total travelled distance. Providing access to parking space is one of the most important issues, since it has an impact on the site layout (Figure 15). The more green and pedestrian friendly the site is, the less parking space can be provided there. Urban factors for car park provision and density set in Local

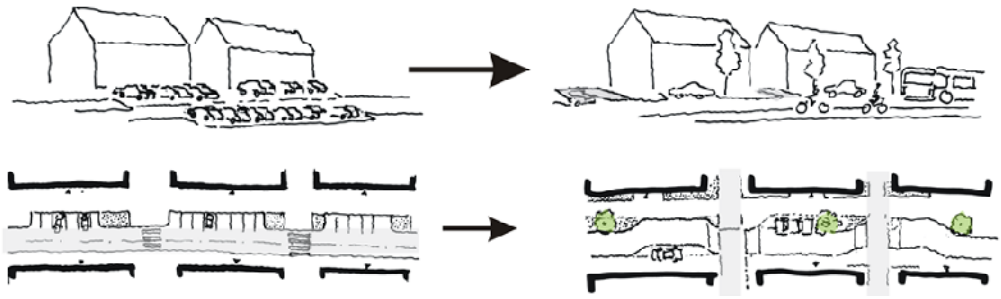
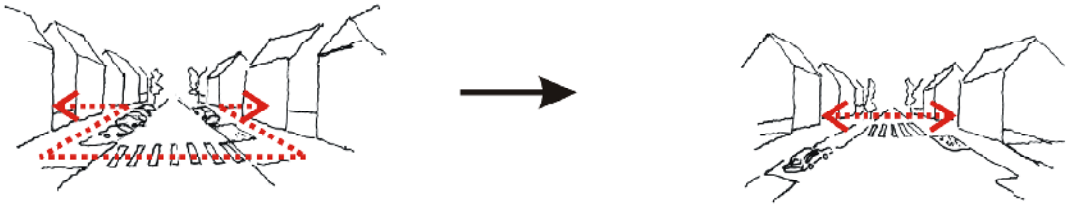


Figure-15: Site layout for different means of transport: left - urban landscape designated for car transport, right - urban landscape designated for various means of transport

2 3.9 million of flats belong to the social housing sector, 2 million (9%) belong to municipalities, 1.9 million of flats (9%) belong to *Registered Social Landlords*.



Figures-16: Better connections for pedestrians

Development Plans should include access to public transport and bicycles. In dense urban areas parking space ratios should be lower, if public transport is considered. Links also play a major role in how people use the space (Figure 16). Access to basic services should be provided both for pedestrians and vehicles, if the distance is too long, the most probable scenario is vehicle movement. Both connectivity and provision of positive public space for pedestrians can be done by urban design and space sharing (Figures 17, 18).

The role of good urban design and its contribution to place attractiveness has been widely described by Gehl and Gemzoe (1996). Very few of the studied cases may be considered as outstanding urban layouts, most of them were average and some of them were below obligatory standards (against the law). This showed that not only does the building law need to be changed, but also a special Housing Quality Assessment should be performed and a set of standards should be written down for future realisations.

Figure-17: Ypenburg, Holland. Examples of multifunctional site use (space sharing): 1 and 2 space for cars and pedestrians with access to flats, 3 flat surface - car park at night, playground during daytime,
Source: Photo by A. Twardoch.

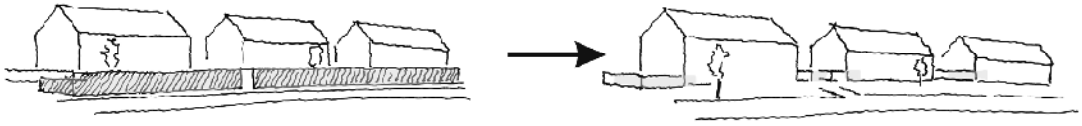


Figure-18: Left: gated estate with only one entrance, right: more open space and several entrances to the housing area

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