

DEVELOPMENT FLEXIBILITY OF THE CITY SPRAWL AREAS PICTURED BY THE AREA IN THE SOUTHERN PART OF WROCLAW

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Abstract. In this text I present the outcome of analysis concerning the southern peripheral areas of Wrocław that have been formed as a result of individual decisions of developers and individuals. The case study includes the districts located along the southern border of the city: Ołtaszyn Wojszyce – Jagodno – Brochów with its adjacent villages: Wysoka – Radmierzyce – Biestrzyków, Żerniki Wrocławskie – Iwiny – Smardzów – Zacharzyce. As one of the largest sprawl areas of the city, it illustrates the threats stemming from this process, but simultaneously it enables testing the flexibility of such sites in terms of opportunities for sustainable development. The analysis of the conflict of scales (regional, municipal and local) and morphology (intensity, consistency tissue, granulation and availability) of this planless and chaotic development leads to discovering its regularity, and above all, to determining the reserves (i.e. uncultivated land) that can be used to increase the quality of urban life in the future.

Keywords: planless development, flexibility, morphology, process, regularity, land reserves.

Introduction

Since 1990's, Wrocław similarly like most contemporary cities has been developing uncontrollably and thus becomes formless. There are four frames of reference that clash in its structure. The oldest and most dominant one is based on a nineteenth-century grid – a radiant system which determines the monocentric city model. The Study for Wrocław Spatial Development tries to change this totally outdated model by imposing the belt system as a direction for development, in which residential belts are interspersed with the industrial ones. Inconsistency of its realization is revealed by a spontaneous development of buildings on the city outskirts, which has taken place over the last several years of the transformation period and is limited only by the city's topographic barriers (rivers, forests) and infrastructure (railways, motorways, airport). The last to slowly mark its share is the ring system that is based on the ring roads (Śródmiejska ring road, motorway bypass and the Eastern Ring Road that is still under construction) and has the potential for binding sites surrounding the access nodes. Given the complexity of economic and social processes, the effect of build-up of these systems is unpredictable.

On one hand, hierarchy-oriented urban planning continues to keep the compact, historical city core, whereas on the other hand, lack of correlation between the individual planning levels leads to decentralization of this core and emergence of a new form of urbanity – “in-between-city” (Sieverts 2003), especially on the outskirts. This impetuously (or even chaotically) sprawling tissue, which consists of multiple separate fragments, has its logic even despite randomness of its composition and form. With greater awareness of this logic a greater control over development of these city parts would be possible, which traditional urban-planning tools fail to provide (Oswald & Bacchini 2003).

This case study includes the districts located along the southern border of the city: Ołtaszyn Wojszyce – Jagodno – Brochów with adjacent villages: Wysoka – Radomierzyce – Biestrzyków, Żerniki Wrocławskie. The study bases on seeking in this part of the city regularities that lead to deeper processes of change. Analysis of morphology of the city in order to trace patterns of new housing development since early 1990’s was critical. The aim was to collect the analytical material to test different development scenarios and to gain a critical look at the Study for Wrocław Spatial Development (Studium uwarunkowań i kierunków rozwoju Wrocławia, <http://uchwaly.um.wroc.pl/uchwala.aspx?numer=L/1467/10>) and master plans in force (MPZP no 508, 168, 65, 177, 102, 452, 56, 57, 35, 47, 324, 297, 403, 289, 496, 287, 288, 290, 258, 378, 379, 230, <http://gis.um.wroc.pl/imap/?gpmap=gp7>).

In particular, it is important to consider the reserves of land that remains undeveloped (green areas, cultivated lands, recreational gardens, former military areas, etc.), of a great importance in terms of development flexibility both in the local and overall city (and regional) scale. A still significant amount of such terrains translates into possibilities for sustainable growth.

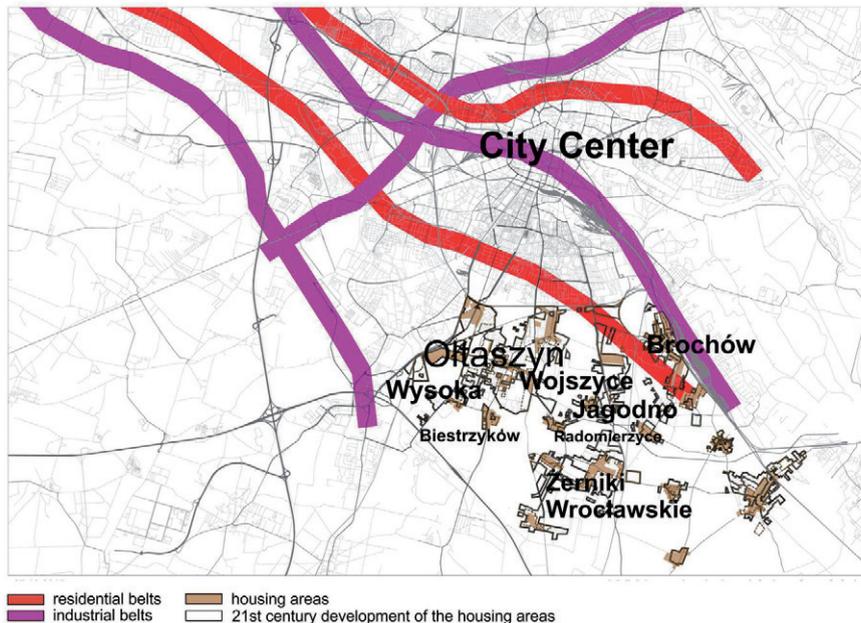


Figure 1. Study area in relation to the city

Boundaries and barriers

The study area has been delimited by: from the west by Karkonoska Street (national road no. 5), from the north by railways along Koszycka, Przystankowa and Terenowa Streets, from the east by railways of the Brochów Node and from the south by the motorway (A4 national road). The study assumed that the industrial railways between Ołtaszyn and Wojszyce city districts have been virtually never used and thus constitute no dividing barrier.

Natural barriers found on the areas within the city boundaries are mainly recreational gardens, including the ones preserved in the plans, between Kutrzeby and Grota Roweckiego Streets, between Buforowa and Granitowa Streets (along Terenowa Str.), a part of which, according to MPZP 289 has been designated as the green wedge, while the rest acc. to MPZP 297: from the boundary with MPZP 289 to Granitowa Street – for single-family housing; between the Wrocław-Sobótka-Strzegom railway line and Starachowskiego Str. (MPZP 56) – mostly gardens for single-family housing, some are kept (from the railway line side); gardens within Jagodno and Brochów are not included in the plan but for MPZP 258 – and those are preserved, gardens in Brochów near Mandżurska Str. (MPZP 379) are intended for single- and multi-family housing.

Croplands and meadows in Brochów and Bieńkowiec area (MPZP 230) are kept as reserves, such as recreational gardens and meadows, in Brochów (MPZP 258) a wedge of Wiaduktowa and Mościckiego Streets was designated for development, in Jagodno (towards Wojszyce) to be developed and partially as a greenery wedge, in Ołtaszyn (MPZP 57) west to Kutrzeby Str. all croplands are to be developed, in Wojszyce (MPZP 297) from the east – as a reserve for a green wedge, on the south to be developed. The existing natural green areas include those along the Ślęza River and complexes of tall trees in Brochowski Park. These include copses and groups of trees separating croplands beyond the city's boundaries.

Moreover, there are several investment lands, such as the plot belonging to the Military Property Agency in Ołtaszyn (which is allocated in half for greenery as a part of the green wedge and in half for development), the racecourse terrains in Partynice, warehouse and industrial area along Karkonoska, Radomierzycka and Buforowa Streets and below Partynice (especially the Trans-Former's plot). These lands constitute approx. 55% of area in question within the city limits and 75% lying outside the city. This shows enormous reserve for flexibility of new development planning.

Transport system

The transport system is dominated by radial streets leading towards the city centre: apart from the aforementioned Karkonoska and Ślężna streets, these include the following: Radosna/Parafialna (exit towards Wysoka), Grota Roweckiego (exit towards Żórawina) connected with Kutrzeby/ Parafialna (exit towards Karwiany) and Buforowa/Bardzka streets (exit towards Jagodno/Żerniki Wrocławskie).

In the transverse (ring-shaped) system, the only route is the string of the following streets: Zwycięska, Kurpiów, Wrocławska (Radomierzyce) and Żernicka that integrate with the existing section of Wrocław Eastern Bypass (towards Siechnice). The extension of the bypass is considered in three variants, of which the most probable one would run below Ołtaszyn, with an option to extend it to the Wrocław West Node on the motorway bypass (Fig. 2) .

Unless this connection is build, the transport system will get increasingly congested, especially during rush hours, as the main exits lead to the streets into which traffic from the other regions

overlaps. The entire study area features an under-invested local transport network. When coupled with absence of strong transversal connections it leads to an additional load to the local systems, caused by drivers seeking short-cuts and detour options to avoid congestions on the main roads.

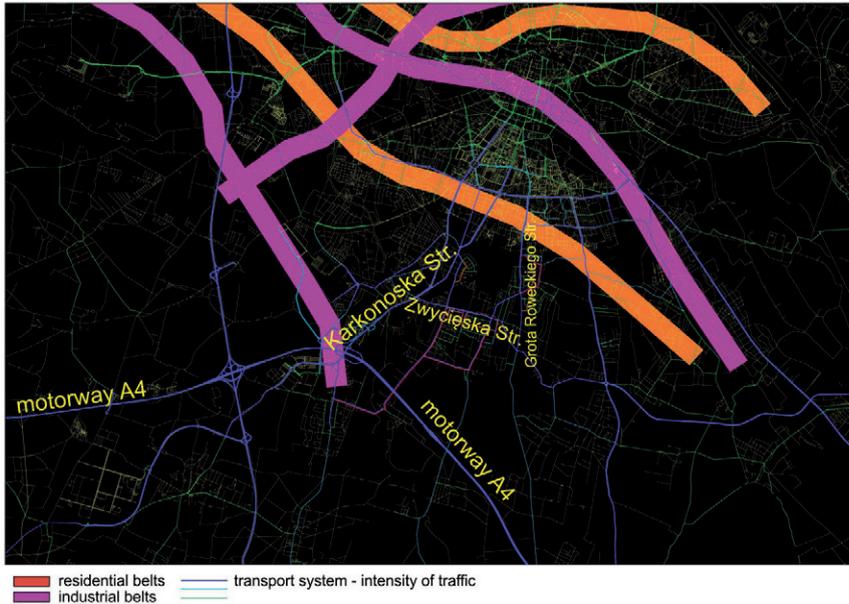


Figure 2. Transport system of the study area, Analysis of intensity of the traffic

Analysis of morphological regularity

An uncontrollably emerged housing fabric forms a structure that is far from traditional. Apart from the local fragments, its character does not allow it to be subject to any classic urban-planning analysis that would relate above all to the composition and form. In the situation of an unrestrained and random (individual decisions) expansion, examining the physical picture of the city is no longer viable and requires a different analytical approach. In my study of the area I used the “Netzstadt” method which seems to serve as good tool for observing the changed circumstances of contemporary city structure since it makes the assumption that ‘(...) the architecture of territory is understood to be transitory in principle, a temporary condition’ (Oswald & Baccini 2003:135). It provides an explanation to morphology by examining such indicators as building density and granulation of the development, and above all its shredding and accessibility. In consequence, it allows determining the nodal fields (elements of the territory) and scopes of their operation on different scales as well as conflicts between scales.

Because of the time scale and unavailability of data, only simplified analyses were performed for the examined area. Intensity and gradation analyses were made based on satellite maps and on-site visits, while shredding has been developed based on the assessment of the two latter parameters plus an on-site verification. In turn, as there are no regular traffic intensity studies run in Wrocław, the availability analysis was performed by way of observation during the rush hours,

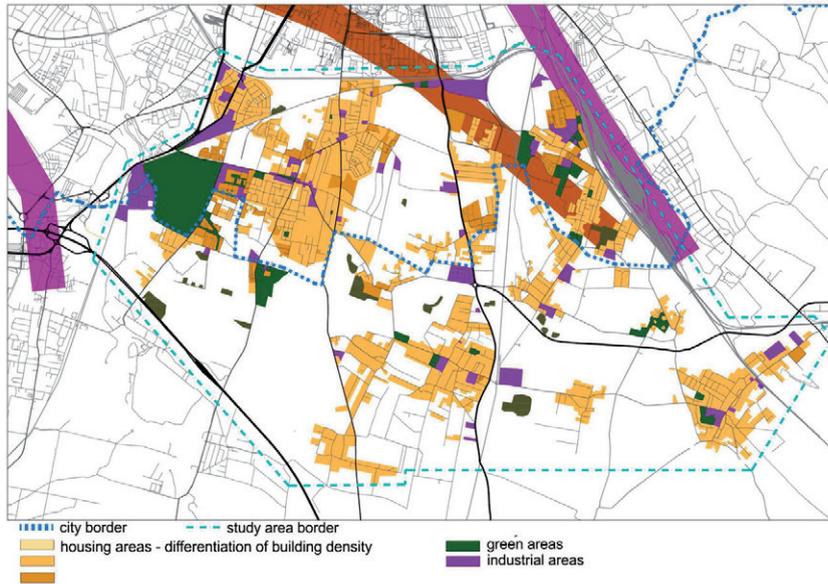


Figure 3. Analysis of building density. 'Building density can verify the type of surface occupation and serves as a tool increasing the resource efficiency in land use. It provides the basis for estimating the ratio between the increased area of land and built-up effective area'

Source: Oswald & Baccini 2003:135.

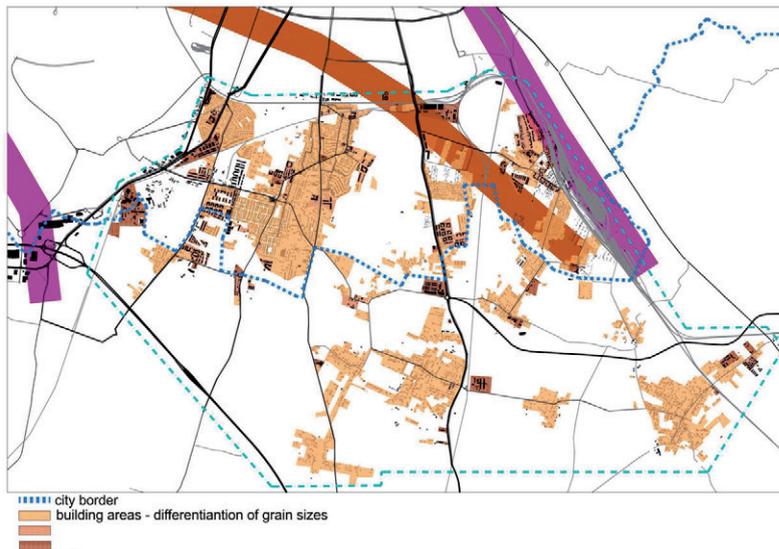


Figure 4. Analysis of granulation. 'The granulation shows the number and sizes of bodies in relation to the selected field. Granulation is a (...) feature that fills and classifies a certain field in terms of the countable number of fragments (...)'

Source: Oswald & Baccini 2003:140.

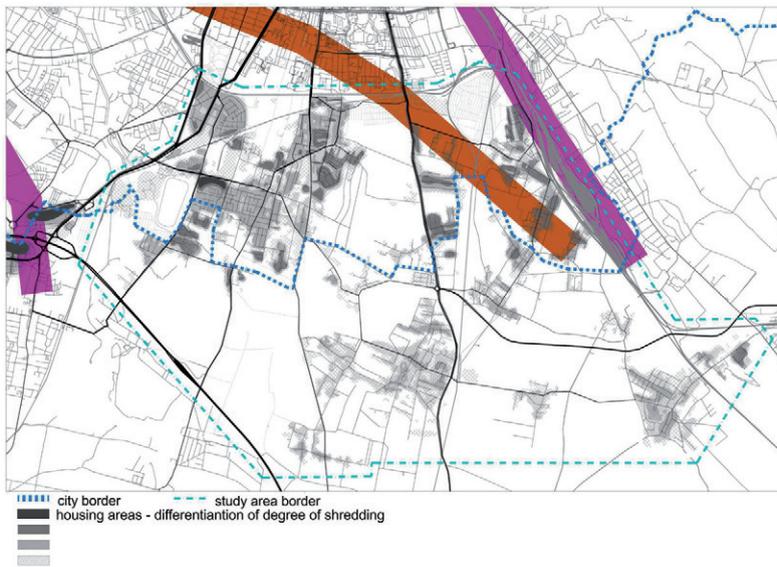


Figure 5. Analysis of shredding.' Shredding can be understood as a function of coherence. The objective of the shredding index is to estimate the appropriate degree of coherence of selected fields'
Source: Oswald & Baccini 2003:138.

a survey among the local inhabitants and data from Google maps. The study of individual values of morphological parameters (Fig. 3, 4, 5) reveals a similar distribution of nodal fields, which results from random combinations of subsequent layers of the emerging fabric.

Until 1990's, this part of the city was not an area of intense investments. Single-family houses constructed after the war did not change the nature of suburban villages. Multi-family residential buildings started to be erected at the turn of the centuries, especially during the 2004-2007 investment boom. They were mainly located in the vicinity of main streets – in Ołtaszyn district (Zwycięska Street), in Jagodno (Antonio Vivali Street), but also in a distance from them, at the back of the existing single-family housing – in Wojszyce district (Smardzowska Street, and Wysoka village (Radosna Street). Gradually, all free areas within the attractive localisations have been filled up (Fig. 6). This direction for development is maintained also in the current local master development plans, where the land reserves cover the terrains in belts along the main streets. Areas between them have been left as a reserve for “green wedges”.

The structure resulting from this process is irregular. New buildings and housing complexes have been developed randomly as a patchwork of independent, compositionally unrelated investments. Their regularity manifests only in their concentration around the communication and service nodes (Fig. 7), however it is more dependent on the accessibility parameter. Its distribution (Fig. 8) shows that the streets are heavily loaded at the exits towards the city centre (Zwycięska, Ołtaszyńska and Grota Roweckiego Streets) and up to Bielany Motorway Node where malls are grouped (Zwycięska Street). An equally heavy load is observable at the entrance roads from the directions leading from adjoining villages.

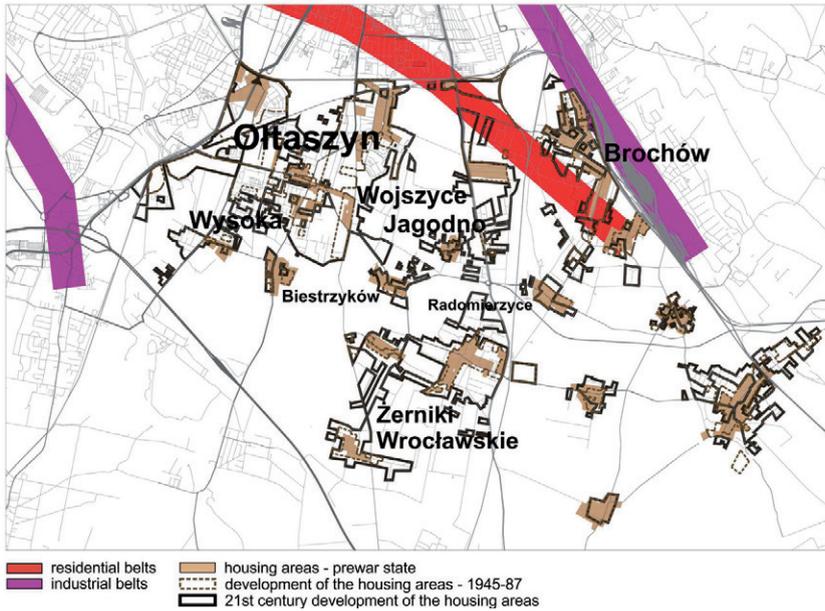


Figure 6. Development of residential areas 1945-2015

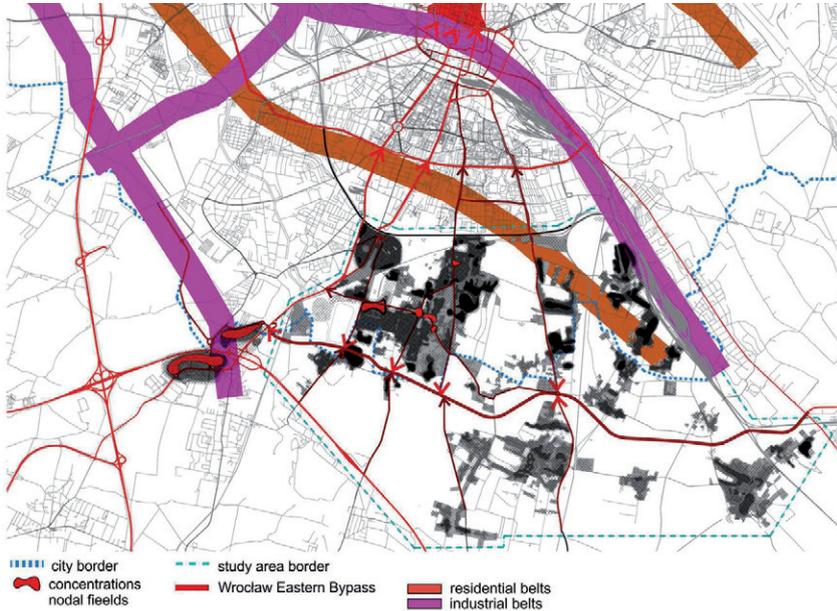


Figure 7. Analysis of concentration (Architecture of the territory). Nodal fields. „(...) flexibility or resistance towards future reconstruction can be recognized morphologically in the current architecture of territory. Proceeding from the network elements, types of territory and territorial attributes, it is possible to attain a synthesized morphological analysis.”

Source: Oswald & Baccini 2003:106.

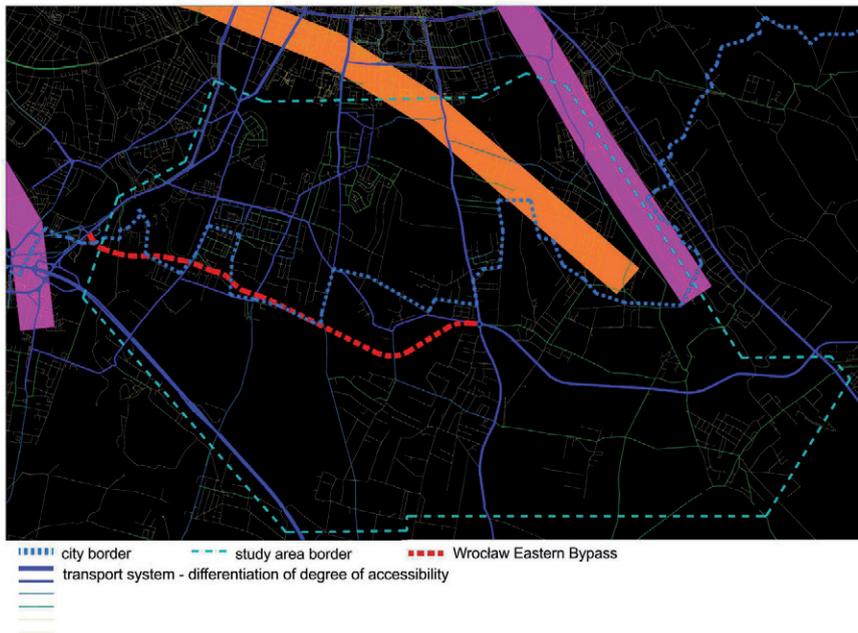


Figure 8. Analysis of accessibility. ‘The accessibility index describes distribution systems and interfaces between different scales. It describes the degree of accessibility by indicating the locally prevailing developmental performance by means of the number of interfaces.’

Source: Oswald & Baccini 2003:142.

Development structure

In relation to acquired data, three variant development models can be examined:

1. ‘Radial’ coupled with “ring-shaped” (bypasses), which effectively has been defined by local development plans (Fig. 9),
2. ‘Belt’, postulated in the Study, divided by transport routes on transversal directions (Fig. 10),
3. ‘Island’, respectively to individual units around initial cores (Fig. 11).

The first model, being the most probable as it has already been put into practice, multiplies the chaotic and patchwork-like development described above. The transport system at the local scale does not require thorough transformations (perhaps apart from individual cases of buildings located away from the main streets), it only needs the eastern bypass to be completed.

The second, except for moving the load to the main streets transverse-wards, does not necessarily have to differ from the radial/ring-shaped system. However, with the development structure legibly arranged into belts, the traffic towards the city centre would be decreased. Another important advantage, highlighted in the Study, is the possibility to intensify the life-work relationships at the local scale (between the residential and industrial belts).



Figure 9. Simulation of the radial model

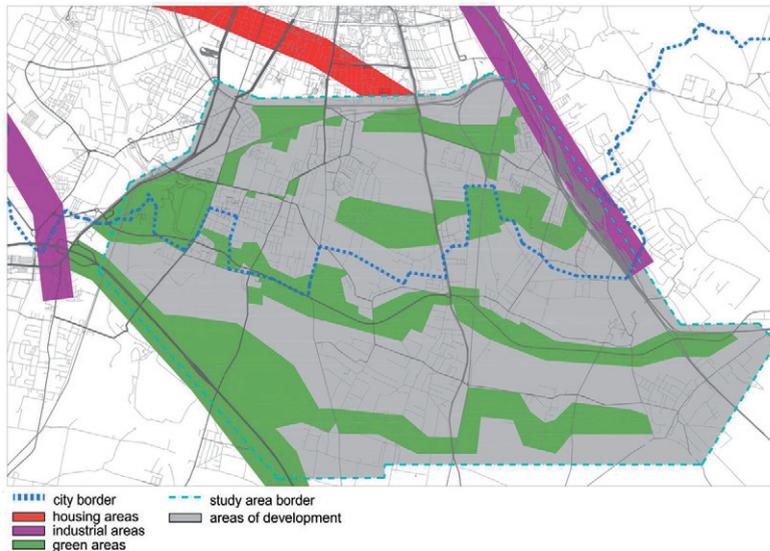


Figure 10. Simulation of the belt model

The third could be considered while limiting the development areas, which would lead to an uncontrolled growth. It would not necessarily involve the decrease in the housing potential, as it could be kept at the same level by the increasing intensity within the nodal fields. This system would also allow for a greater control over distribution of service nodes, as well as reducing scale

conflicts (Joutsiniemi & Michaeli 2005). In terms of transport, this system corresponds to the belt model, whereas its unquestionable advantage would be no need to extend local transport systems.

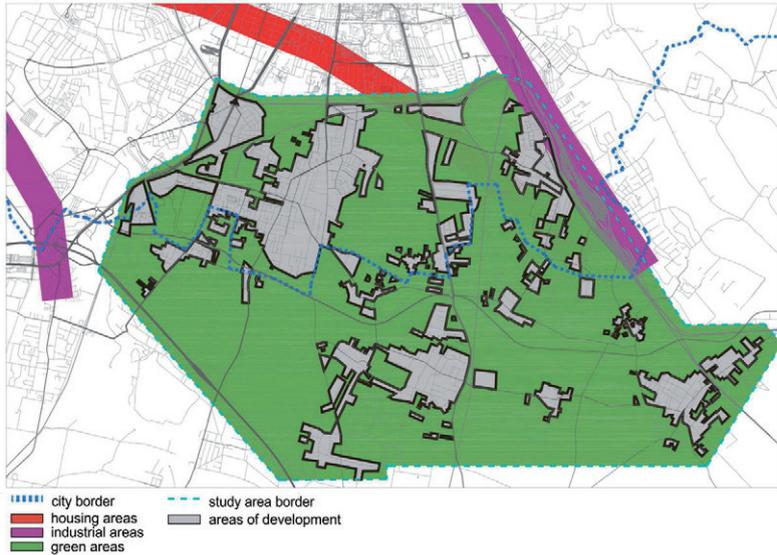


Figure 11. Simulation of the island model

Conditions for sustainable growth – conclusions

The research emphasis on how the addressed models of development translate into terms of shaping sustainable growth. To achieve such a state, urban-planning decisions should take the following desirable features into account:

- evenly distributed development areas within the city structure,
- well-balanced traffic,
- accessibility to greenery and natural areas outside the city,
- proper aeration.

Three models include these features in different ways. With regard to balancing the building structure, the radial model definitely leads to maintaining (and reinforcing) unfavorable tissue. Spontaneous, commonly understood as chaotic, leads to the accumulation of development in the lands along the borders of the city, between the main routes (as an extension of the radial system outgoing from the city center). The building tissue arising generatively from random investments decisions fills gradually the area between the mentioned barriers – the border of the city and the railways to the north. Thus it comes to a strengthened system of nineteenth century monocentric structure.

The situation could be controlled by limiting development until the expansion of the transport system, which would allow the creation of more flexible system of independent belts or islands of development. However, the belt model is not implemented and remains a theoretical proposal, mainly because the transport system is being formed as secondary to vigorously advancing residential

areas. In the absence of the loop in the ring system (i.e. mainly the Easter Bypass) excessive growth of traffic (including suburban villages) must be carried by overloaded existing streets leading to the main radiant streets from the center (e.g. Zwycięska Street towards Karkonoska Street and Grota Roweckiego Street). In the absence of the other opportunities to move, the whole system is focused on these streets and even after expansion of the transport system in future, this situation will not be possible to be changed. Thus, the most balanced system would take place in the island model.

As for issues related to greenery (green wedges and land reserves), the radial model again seems to be the least favourable. The scheme of green wedges suggested in the Study does not seem to contribute much, as directions of the main winds are contrary to their directions, and also because they have no extension into the city centre (above the Wrocław Ring Road – Armii Krajowej Street). Only the wedge created at the line of Skowroni Park, recreational gardens at Spiska Street, General Anders Park and the terrain by Anders Hill remains as a significant undeveloped area. However, local development plans for Ołtaszyn (MPZP56, 57, 452) do not build its extension towards Partyńce (racecourses). Also, the ending of this wedge at the junction of Słężna and Borowska Streets is being slowly developed. Thus, only the green belts dividing the development arranged according to the belt model would enable greater airing opportunities. Moreover, they would create legible separating areas between the residential housing and in particular industrial development. Of course, the island model would serve in the same way.

When examining the local situation with reference to the entire city structure, and especially taking a balanced development of its individual parts into account, striving for the island model seems most favourable. With this end in view, reserves of green areas should be kept, or could even preserve their current use status. The open, perforated development structure would provide for maximum flexibility, simultaneously enabling linking the green network in all directions. An additional argument supporting this model can be a decreasing number of the city inhabitants –according to estimates by approx. 50 thousand in 2013 (Dziubiński 2014).

Giving up with land reserves lowers the chances (or even makes impossible) to reduce conflicts of scale for different level access. 'In the majority of cases the biggest movements can be found at medium range characteristics path lengths, which mark the transition from local or communal to regional scale' (Joutsiniemi & Michaeli 2005:11). This translates into lower quality space and above all lower quality of life at the local scale, but also into poor functioning of the whole city.

Conclusions given above show that the policy oriented on hierarchical planning cannot react on processes driven by stakeholders. Current policy results in unwanted consequences. Therefore the island model still remains a promising alternative. It would enable strengthening the independence of local structures and better distribution of service nodes that allow the greatest flexibility of future development.

Acknowledgements

Following local spatial development plans were used:

- 508 enacted on 11.07.2013 – Resolution no. XLVII/1149/13 i 168 enacted on 29.12.2003 – Resolution no. XVII/496/03 – regional road, Partyńce.
- 65 enacted on 29.12.2003 – Resolution no. XVII/495/03 – Partyńce South (Part B).
- 177 enacted on 4.07.2002 – Resolution no. L/1754/02 – Partyńce South (Part A).
- 102 enacted on 23.01.2003 – Resolution no. V/51/03 – Zwycięska 57.
- 452 enacted on 28.12.2012 – Resolution no. XXXVI/827/12 – Zwycięska, Ołtaszyńska, Agrestowa.

- 56 enacted on 11.03.2002 – Resolution no. XLVI/1558/02 – Ołtaszyn, Northern Part.
- 57 enacted on 1.04.2004 – Resolution no. XXI/1792/04 – Ołtaszyn, Southern Part.
- 35 enacted on 5.06.1998 – Resolution no. LII/780/98 – Ołtaszyn- elementary school.
- 47 enacted on 28.11.1997 – Resolution no. XLV/621/97 – Parafialna.
- 324 enacted on 10.07.2008 – Resolution no. XXIII/734/08 – Wojszyce, Southwestern Part.
- 297 enacted on 14.02.2008 – Resolution no. XVIII/517/08 – Wojszyce.
- 403 enacted on 22.10.2009 – Resolution no. XL/1263/09 – Pawia.
- 289 enacted on 25.02.2010 – Resolution no. XLVI/1406/10 – Jagodno-Wojszyce.
- 496 enacted on 30.12.2013 – Resolution no. (tekst) LII/1315/13 – Bardzka, Buforowa.
- 287 enacted on 13.03.2008 – Resolution no. XIX/541/08 – Jagodno I, Northern Part.
- 288 enacted on 11.09.2008 – Resolution no. XXIV/881/08 – Jagodno I, Southern Part.
- 290 enacted on 13.09.2007 – Resolution no. XII/263/07 – Jagodno II.
- 258 enacted on 9.09.2004 – Resolution no. XXVI/2149/04 – Brochów, Bieńkowice (Part C).
- 378 enacted on 17.11.2011 – Resolution no. XVIII/369/11 – Centralna, Polna, Chińska.
- 379 enacted on 18.04.2013 – Resolution no. XLII/1044/13 – Koreańska, Woskowa, al. Róż.
- 230 enacted on 1.04.2004 – Resolution no. XXI/1793/04 – Brochów, Bieńkowice (Part A).

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- Sieverts T., 2003. *Cities Without Cities: An Interpretation of the Zwischenstadt*. New York: Routledge.
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