Modernist Housing Estates – Examining the Conditions of Redevelopment of Outdoor Space. The Case Study from Łódź, Bałuty

Małgorzata Hanzl(✉)

Institute of Architecture and Town Planning, Lodz University of Technology, Al. Politechniki 6A, 93-590 Lodz, Poland
mhanzl@p.lodz.pl

Abstract. The focus of the current paper is the form of outdoor space in Modernist housing estates. I examine relationships between urban health and liveability and forms of urban structures. The goal is to define the quantitative and qualitative features of the urban environment that influence the liveability of these places and evaluate their impacts. I look at forms of open spaces and their organisation. Special attention is paid to the qualities of green infrastructures (GI) and the characteristics of built structures. Modernist theoretical thinking attributed a lot of attention to assuring proper insolation thanks to the provision of ample space between buildings. However, the implementation of these ideas often lacked consistency. With time, the initial provision of green landscaped recreational space imagined by designers became replaced by congested parking lots. Once proposed as safe and cosy, actual resulting places proved windy and often isolated. In the current article, I examine the details of two housing estates located in Bałuty in Łódź. The objective of this analysis is to propose recommendations on how to improve the current situation and, at the same time, the living conditions of local residents.

Keywords: Public space · Liveability · Urban form · Morphology

1 Introduction

The current paper examines the outdoor space in the Modernist housing estates. The objective is to determine the quantitative and qualitative features of the urban environment that affect the liveability of these places and evaluate their impacts. I focus on forms of open spaces, the qualities of green infrastructures (GI) and built structures attributes.

First, the positive impact of greenery on citizens' well-being is broadly recognized; it belongs to essential exogenous factors that condition urban health. Vegetation reduces local temperatures due to evapotranspiration, provides shade and reflects solar radiation. At the same time, it absorbs air pollutants and reduces noise levels. Moreover, parks, gardens, and access to street vegetation encourage social life and physical activities. They reduce stress and help to relax, which enhances residents' mental health. Furthermore, vegetation contributes to buffering climate change risks.

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Second, forms of streets and open spaces affect the availability of infrastructure for various activities and mobility modes. Access to open space in the built environment has an impact on residents' lifestyles and well-being.

The current paper applies qualitative and quantitative assessment to a modernist housing estate in Bałuty, Łódź, Poland. Studying the typologies of residential structures from the 20th century, we notice the evolution of forms. The focus on residents' well-being reveals the changing roles and forms of the urban environment. The typo-morphological approach proves helpful in defining the current rehabilitation strategies of modernist housing estates.

2 Research Background

2.1 Liveability and Health

Cambridge Dictionary defines liveability as *"the degree to which a place is suitable or good for living in"*. The term liveability has got multiple meanings. The concept emerged in Dutch spatial planning in the 1950s (Kaal 2011), and since it has become broadly used in various geographical and disciplinary contexts (McCann 2007, 2013; Holden and Scerri 2013; Wetzstein 2013; Teo 2014; Zhan et al. 2018; McArthur and Robin 2019; Paul and Sen 2020). Furthermore, numerous liveability indexes brought immense popularity among city governments looking to attract investments and global capital (Holden and Scerri 2013). The term is broadly used in policy documents and urban strategies (Clarke and Cheshire 2018) and has become one of the main topics of global discourse proliferating into the policy of international organisations (UN Habitat 2008, 2016; World Bank 1996, McArthur and Robin 2019). These documents present urban health and environmental resilience as essential elements of a liveable urban environment (UN Habitat 2016; WHO 2016). The importance of health as a nexus of urban design is supported by ample evidence (Saelens and Handy 2008; Jackson et al. 2013; Giles-Corti et al. 2016; Forsyth et al. 2017). Improved liveability equals residents' health and wellbeing and vice versa. Among various aspects of liveability, researchers list:

- access to public transport (Knuiman et al. 2014),
- walkability (Frank et al., 2006; Hirsch et al. 2014),
- access to multiple forms of urban greenery and recreation facilities (Sugiyama et al. 2013; Kaczynski et al. 2008; Mitchell and Popham 2008; Gascon et al. 2015).

Research provides substantial evidence that these factors affect both physical fitness and mental health (Alderton et al. 2019; Forsyth et al. 2017, Sarkar et al. 2014).

Moreover, studies (Forsyth and Musacchio 2005, pp. 3–5; Marselle et al. 2019) show that green space works the best when its various forms contribute to a system which offers a range of activities for various users. The overlap of activities also proves beneficial for specific users (Sarkar et al. 2014, p. 102). All of them should be open to all users, including those with mobility impairments and endangered by social exclusion (Harnick 2006, p. 57). The main criteria for the evaluation of green space are (Forsyth et al. 2017):

1. Access - physical access refers to the optimum distance to a park of a minimum size of 5 ha, which should be between 400 to 800 m for all the buildings. It can be enhanced thanks to the public transportation opportunities. Visual access – the later was confirmed by the study on patients' recovery (Brown et al. 2013).
2. Connections - they offer system qualities and include rows of trees in streets, boulevards or greenways and distinct paths and green trails.
3. Variety of forms - as an element which offers a range of available activities.

The forms of green spaces include (Forsyth et al. 2017): urban parks, including pocket parks, recreational facilities (e.g., playgrounds), trails, paths and greenways, tree lines, tree canopy, greenery near buildings.

A special quality which should be emphasised in the current study is safety from traffic and the availability of outdoor spaces and recreation settings and vegetation suitable for young children (0 to 7 years old). (Christian et al. 2015, pp. 30–33). When open space is limited, some benefits for residents' psychological wellbeing might be satisfied thanks to the small green yards, tree lines along streets, and even visual access to verdure from windows (Forsyth et al. 2017; Brown et al. 2013).

Moreover, green open spaces reduce summer temperatures and regulate Urban Heat Island (UHI), contribute to water retention and reduce noise and pollution levels. In the current study, I am looking to apply the results of contemporary research on liveability and urban health to assess Modernist residential development.

2.2 Modernist Concepts Versus the Organisation of Open Space

The debate on living conditions in cities started in reaction to worsening urban environments as a nexus of 19th-century industrialisation and urbanisation processes. Early hygienist movement and efforts to improve sanitary conditions led to the implementation of new building regulations at the beginning of the 20th century; for instance, in Germany, new construction codes were adopted in 1925. One focus of these debates was the integration of green spaces, which were perceived as a remedy to the artificial urban environment. These discussions continued as one of the core concepts of the Modernist movement. They were accompanied by commonly shared concerns on how to improve the housing conditions of the masses. Tony Garnier's Cité Industrielle (elaborated in 1901 and published in 1917), which introduced one of the Modernism founding concepts - functional zoning, proposed continuous and open to everyone space, which would accommodate residential structures along with all other necessary facilities (Mumford 2018, pp. 70–71). American planners at the beginning of the 20th century focused on similar issues. They looked for the introduction of greenery to the central city as a measure to address the environmental decay, along with issues of better traffic organisation and relocation of industry to the outskirts (Mumford 2018, p. 121).

In Radburn, the safe pedestrian circulation and access to green spaces materialised in residential superblocks by Clarence Stein and Henry Wright (Mumford 2018, p. 130). All the above ideas became afterwards central for Modernist planning. Le Corbusier adopted these concepts into his proposals for the ideal city. The widespread and influential series of projects started with Ville Contemporaine (The Contemporary City for Three Million Inhabitants), which in 1922 appeared in l'Esprit Nouveau - an avant-garde journal which

Le Corbusier co-edited with Amédée Ozenfan. The proposed linear forms of massive housing structures were placed in the park-like green environment. The circulation was to be provided by a system of independent roads for a variety of vehicles, covered railways and an airport (Mumford 2018, 148–149). Separate walkways were embedded in green spaces.

The Garden Cities movement and Bauhaus ideas found their continuation in workers' housing estates designed by Jacobus Oud in the Netherlands and Bruno Taut and Erns May in Germany. However, unlike Le Corbusier, these architects, who also represented Modern Movement (the name used by Eric Mendelsohn in 1931), preferred low-rise complexes with traditionally organised green spaces for recreation and social interactions over massive apartment buildings.

All the above concepts were subject to discussion by the members of Congress International d'Architecture Moderne (CIAM). They became integrated into the key document of the organisation - the Athens Charter - published after its Fourth Congress on the Functional City in 1933, which took place on the board of a ship Patrice which sailed from Marseille to Athens. This highly influential manifesto affected the development of cities globally. The role of green spaces was underlined as an element separating functional zones to reduce the negative impact of adjacent conflicting activities. Moreover, green spaces were to be embedded into urban cores to reduce the densities and satisfy the needs of citizens' recreation (Solarek 2015, p. 31).

The considerations about the right density of development and the proportions of built and open spaces were further developed by Modernist thinkers. It was reflected in Gropius'es well-known diagrams analysing the relations between buildings' insolation and available open space and their height and rhythms (published in 1929; Mumford 2018, pp. 159–160). He also verified these possibilities by proposing an 11-floor slab high-rise in Berlin district Spandau (1928, unbuilt). Another influential idea was the separation of districts with green open strips, which lowered density and formed a continuous green system; this concept was first introduced by Eliel Saarinen and Erich Gloeden in their Plan for Helsinki of 1918. It was further broadly emulated, among others, in the plan for Moscow (1935), which also proposed reduced densities (200 people per acre, 6–7 floor apartment buildings) than in other districts. The public transport development and communal facilities complimented the planning directions (Mumford 2018, p. 168).

CIAM ideas strongly influenced the organisation of European residential districts postwar. The rebuilding after war damages followed the Modernist guidance. Across Europe, numerous estates, such as London's Churchill Gardens, Westminster, and West Berlin's Hansawiertel, replaced the war-damaged districts. The typical features of this development were massive residential structures and vast open green spaces in-between. The inspiration with Le Corbusier's Unité d'Habitation de Marseille (1946) is evident. In Eastern Europe, including Poland, Modernism soon got widely adopted after the early social realism and neoclassical styles manifested in structures built directly after WW2. Projects which were built early or started yet before WW2 used the concept of "social neighbourhood" by Social Construction Company (SPB) and the Warsaw Housing Cooperative (WSM); in this group, there were, among others: Warsaw districts of Rakowiec, Żoliborz, Młynów, Muranów, Wierzbno (the 1950s). Their design (some of the concepts yet elaborated during the Nazi occupation) continued works on social housing of

PTRM started as early as 1928. In the 1960s and 1970s of the 20th century, prefabricated large scale construction systems dominated the housing industry (Chomątowska 2018). In Eastern Europe, Modernism continued until the 1990s and times of political transformation.

Throughout the whole period, some of the main features persisted. The most important was the general organisation of space which remained open and accommodated freely distributed structures. Designers planned green spaces to isolate functional zones and protect residential buildings from traffic; normative regulations determined their size (1964, 1974, after Skibniewska 1979, p. 13). As a result, in Modernist housing estates, there are a lot of open green spaces, but they often lack human scale (Solarek 2015). The critics also pointed out the lack of organisation of open spaces, which needs more specific delimitation of private, semi-private, semi-public and public zones. Besides, they referred to the lack of the context for social activities, both in terms of environmental facilities and information layer - meanings of various equipment elements (Skibniewska 1979, p. 12). Another requirement defined in norms was locating recreational facilities near residential structures. As an outcome, the greenery that accompanied housing estates connected with green spaces surrounding educational institutions and recreational facilities.

3 Methodology

The current research continues the earlier study on urban health in Modernist housing estates (Hanzl and Rembeza 2022). Similar to the previous research, the initial analysis refers to some quantitative factors, including Floor Area Ratio (FAR), Building Coverage Ratio (BCR) and Green Area Ratio (GAR). This follows the methodology proposed by Sarkar et al. (2014, pp. 84–124), who indicate the need to examine the relations between characteristics of the built environment, residents' behaviours and health outcomes. As a next step, I look at the accessibility of green spaces and recreational facilities. The focus is on the typology derived from the study by Forsyth et al. (2017), as discussed in the previous section. Accessibility also refers to public transportation opportunities and active mobility options. The latter is congruent with the pedestrian connectivity, which in the case of Modernist housing estates might be subordinated to different rules because of the segregation of traffic. In order to examine the liveability in the current study, I have complimented the earlier set of conditions by the analysis of activities. Gehl (2010) defines the following types of activities: necessary, optional and social. In order for optional and social activities to take place, the settings in which they might reveal should satisfy the need for comfort. The presence of necessary activities, which is reflected by the configuration of the sociometric layout, is the first step for other types of activities to happen. In the current research, I have been looking at three elements:

1. activities which take place in outdoor spaces,
2. arrangements of these spaces,
2. Sociometric layout.

The latter has been defined following the method proposed by Hiller and Hanson (2003), which later led o the development of the Space Syntax methodology. This method enables direct tracing of the basic layer of connectivity within the analysed housing estates. Moreover, the definition of building typology and morphological regions (Oliveira 2016) complement the conducted research.

4 Case Studies – Two Modernist Housing Estates

The spatial scope of work includes two housing estates located in Łódź, Bałuty district:

- Zgierska-Stefana estate,
- Inflancka estate.

Both estates have been designed following the Modernist principles of high-rise structures surrounded by green open spaces. They were both built using prefabricated large-scale concrete elements. The housing estate Zgierska Stefana was designed between 1971 and1972 by a team which represented Inwestprojekt included: Leszek Paperz, Ryszard Daczkowski and Andrzej Bohdanowicz. Its construction started in 1973 and lasted for over a decade. The structure used prefabricated armed concrete systems Dąbrowa 70 and W-70. The intended number of residents was approximately 9 000 (Dziennik Łódzki 1971).

The estate Inflancka was designed in 1972, and its construction started soon after. The designers' team: Krystyna Greger, Zdzisław Lipski, Jakub Wujek and Andrzej Owczarek represented Miastoprojekt. The proposed number of residents was 8000. The 11 and 5-floor slab structures were distributed among green areas and recreational facilities. Designers also proposed a system of organisation of playgrounds based on plates 10 × 10 m, each containing different facilities (Dziennik Łódzki 1972).

The contemporary Bałuty district features a number of Modernist housing estates. The post-war transformation of its territory started directly after the end of WW2 during the socio-realism period. Initially a suburb of Lodz, it housed primarily poor inhabitants in fast built, low standard houses with no water or sewage. During WW2, the Litzmannstadt Ghetto, located there by Nazi occupants, deepened local development degradation. Therefore, the socialist administration chose to rebuild the area of Bałuty and construct new neighbourhoods. The first vision was designed in the Warsaw Office of Workers Settlements[1] by a team led by Ryszard Karłowicz. The initial intervention included six estates (Ciarkowski 2018, p. 142). Its designers followed socio-realistic building methods with perimeter blocks and a regular street network.

Later interventions applied Modernist principles and prefabricated large-scale concrete building structures. The development continued until the end of the transformation period, and some elements have been added recently.

[1] Zakład Osiedli Robotniczych.

The history of this transformation is reflected in the forms of local structures. Specifically, due to the economic conditions, many pre-war buildings had to be left untouched, which resulted in significant fragmentation of space of both estates. In between blocks of flats, we find pieces of 19th-century development, including fragments of historical streets, some pre-war tenements, or single-family houses with private courtyards and gardens (Fig. 1).

The Zgierska-Stefana estate is surrounded by three arterial roads: Zgierska, Julianowska and Łagiewnicka. There are tramway lines in Zgierska and Łagiewnicka and numerous buses on all three streets. Inflancka Street delimits Inflancka estate on the north and Łagiewnicka on the west. The site is cut through Franciszkańska street. In these major streets, there are trams and buses. Both estates are very well connected to other parts of the town. They are also both close to nearby large parks: Julianowski Park and Szarych Szeregów Park.

5 Results and Discussion

5.1 Buildings Typology



Fig. 1. Typology of built structures in Zgierska-Stefana (A) and Inflancka (B) estates, Bałuty, Łódź. Symbols: 1. 12-floors wave blocks, 2. 4–5 floors, blocks of flats, 3. tower buildings, 4.auxiliary structures, 5. services, 6. buildings in historical parts, 7. site limits, 8. historical development; A1, A2, … - units IDs.

Figure 1 depicts the locations of historical structures and Modernist residential buildings. In the Zgierska-Stefana estate, there are two main types of blocks of flats: 11–12 storey buildings in a wave-like form that isolate the development from surrounding arterial roads and lower 4–5 floors structures located inside. In the case of the Inflancka estate, there are 11-floor slabs and 5-floor, smaller blocks of flats. The distribution of both types is based on geometric rules. In both cases, the arrangement of buildings is strongly affected by the configuration of historic streets.

5.2 Quantitative Analysis

The results of the analyses based on the methodology indicated in the previous sections are shown below - in Table 1 and Fig. 3. It includes the calculations of Floor Area Ratio (FAR) and Building Coverage Ratio (BCR) parameters complemented by the analyses of Green Area Ratio (GAR).

Table 1. Results of calculations of FAR, BCR and GAR values for both estates.

Field ID	Total area [m^2]	FAR	BCR	GAR
Zgierska-Stefana estate				
Streets	77718	0	0	20
Historical development (A)	117067	0.9	32.5	10
A1	13561	1.6	13	47
A2	23710	1.5	23	26
A3	27319	1	14	33
A4	34836	1.3	12	36
A5	19557	1	20	60
A6	20049	0.9	18	54
A7	22915	0.7	15	52
A8	30258	1.4	12	55
A9	27565	1	10	41
A10	21314	1.9	16	44
A11	32028	1.4	13	36
A12	22448	1.6	18	43
Inflancka estate				
Historical development (B)	414472	0,2	10	5
B1	109270	0.8	13	34.5
B2	266759	0.8	12	48
B3	5059	2.2	20	5
B4	7623	0.4	8	19

The FAR values for Zgierska-Stefana estate are moderate (from 0.7 to 1.9), which is typical for urban areas. Inflancka estate features similar values (0.8). In Modernist estates, such values are, as a rule, accompanied by rather low BCR, ranging from 12% to 23%. Whereas FAR remains similar in the case of traditional development, the BCR values are much higher there (32.5%). The same characteristics is also followed by the share of open green spaces. In the case of Modernist estates, the GAR values range from 26 to 60%, while in the case of historical development, the share is as low as 10% or 5% for Inflancka estate (Fig. 2).

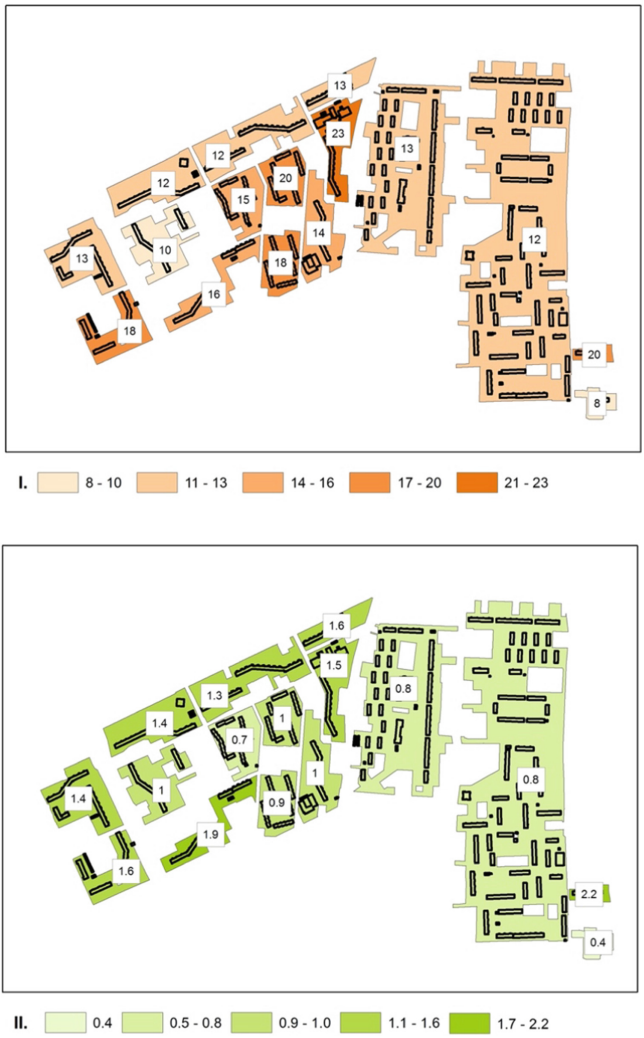


Fig. 2. The results of analysis of I. Building Coverage Ratio, II. Floor Area Ratio



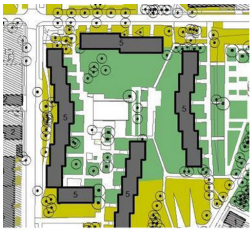
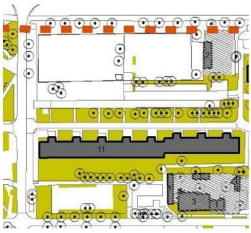
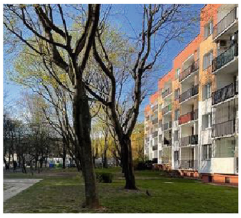
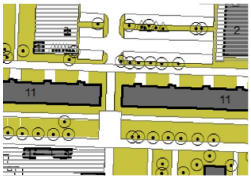
Fig. 3. The general layout of Zgierska-Stefana and Inflancka housing estates with the analysis of types of open, green spaces. Symbols: 1. Greenery isolating and accompanying buildings, 2. Recreation spaces, 3. Historical parcellation, 4. Site delimitation. (Color figure online)

5.3 Forms of Open Spaces

In the housing estate Zgierska-Stefana in Łódź, there are the following types of open green spaces: recreation spaces with playgrounds, spaces of isolation which accompany parking lots and arterial roads surrounding the estate and rows of trees and lawns near buildings. The last type usually is connected with fragments of historical streets which remained from the past development. Due to the presence of these streets the segregation of traffic is not very rigorous.

Playgrounds and recreation spaces are located in the central part of the estate, surrounded by lower buildings. They are fully isolated from traffic by surrounding blocks. Green spaces located more in the outskirts due to the parking function serve more for isolation from noise and pollution of surrounding streets. People rarely sit there or stop to spend time. Contrary, the recreational sites in the middle, thanks to their scale (typical dimensions circa 50–65 m $\times$ 50 m) and safety from traffic, are popular. They invite all age groups, including children and young adults who frequently exercise there and the elderly, who meet there to chat. Tree-lined streets provide access and connectivity between other locations. Besides, greenery which accompanies both streets and urban blocks enables views from windows and thus increases the psychological well-being of inhabitants. At the same time, the presence of historical streets allows cars to penetrate the estate more freely, which reduces space available for recreation. Moreover, external locations tend to be overwhelmed by parking cars which endanger traffic safety (Table 2).

Table 2. Forms of open spaces

Type of space	Plan	Photographs
	Zgierska-Stefana estate	
Recreation – playground and open space		
Isolation and parking		
Greenery near buildings		
	Inflancka estate	
Recreation – playground and open space		
Isolation and parking		
Greenery near buildings		

The organisation of space in Inflancka estate is based on geometrical principles. The layout of this estate resembles the diagrammatic drawings by Walter Gropius of 1929, where the distances between buildings were adjusted to their heights. In general, rows of 11-floor slab buildings are accompanied by larger open spaces, which either accommodate parking lots or vast green spaces with some recreation facilities. In some cases, both types of activities are included. At the same time, spaces which contain these facilities are vast and their scale is not adjusted to the recreational activity which should happen there. Moreover, direct proximity of parking and playgrounds endangers safety. In the case of lower 5-floor buildings, they form comb-like rows, with small (25 m × 25 m) green yards in between. However, these green yards are not big enough to contain any kind of recreational facilities - therefore, they might be classified as greenery near buildings. In all, the scales of spaces are not adjusted to the activities happening there. What is more, the penetration of estate by numerous streets overlaps with these adverse effects, creating confusion and decreasing traffic safety.

5.4 Sociometric Layout

The analyses of the principal sociometric layout made it possible to trace how people use space based on its configuration imposed by the distribution of paths and entrances to buildings. According to Gehl (2010), spaces that integrate more activities are more active since synergy is an effect. In the case of the two analysed estates, the organisation of space in Zgierska Stefana answers these requirements better than Inflancka estate. This is partially due to the integration of historic streets, which imposed the distribution of buildings in a very clear way. Tall buildings are located outside and lower blocks inside. What is more, the organisation is to some extent concentric - turned towards the



Fig. 4. The image shows a configurational analysis for the housing estate Zgierska-Stefana.

core offered by recreational spaces. This results in at least partial delimitation of zones for various activities.

In the case of Inflancka estate, the geometrical principles applied to satisfy the requirements for insulation do not take into account activities happening between blocks. Therefore, the relationships between locations of entrances and what follows - sociometric layout - and activities seem random (Figs. 4 and 5).

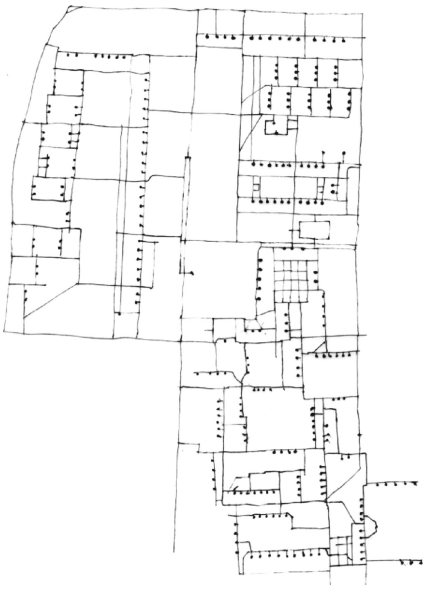


Fig. 5. The image shows the results of preminimary configurational analysis for the Inflancka housing estate.

6 Conclusions

Both analysed housing estates feature similar types of development and fulfil many of the assumptions defined by the CIAM founders. The FAR and BCR values are comparable; both estates offer good access to nearby greenery and some recreational facilities. They have good connections with other parts of the town thanks to the public transport and are close to large parks. At the same time, they both are located in the historical district, where the economic conditions imposed preservation of some of the previous structures. However, even if the dates of construction of both estates remain the same, the applied solutions differ. In the case of Zgierska-Stefana district, the organisation is more concentric, with larger units located outside and separating from arterial traffic and smaller buildings enclosing interior recreational spaces. This layout somehow relates to the traditional logic of urban perimeter blocks. Some of these principles were applied in the Inflancka estate, too; there are rows of blocks along Franciszkańska and Inflancka

streets. At the same time, the overall design of this second estate is subordinated to the geometrical principles. As a result, the layout and context (scale of outdoor spaces, integration of various functions) do not consider the needs of activities in the outdoor areas. This last observation has been supported by analysing sociometric layouts of both estates.

Also, the integration of historical development differs. In the Zgierska-Stefana estate, the pieces of historical streets, on the one hand, organise space and provide greenery accompanying buildings; on the other, their presence leads to space fragmentation and decreases traffic safety-enhancing cars' presence inside the estate. In the Inflancka estate, pieces of historical development, due to their distinct forms, make understanding the logic challenging, at the same time also creating an adverse effect of more traffic inside the estate.

In all, whereas open space and greenery are abundant in both estates, their organisation could clearly be improved. The most pertinent issues are traffic safety and the better adjustment of space to the needs of activities and their synergies. The presence of open space and vegetation caters to some needs of the local residents, for instance, regulating UHI, and providing visual satisfaction. Still, however, there is a lot of space for improvements.

References

Alderton, A., et al.: What is the meaning of urban liveability for a city in a low-to-middle-income country? Contextualising liveability for Bangkok, Thailand. Glob. Health **15**(1), 51 (2019). https://doi.org/10.1186/s12992-019-0484-8

Brown, D.K., Barton, J.L., Gladwell, V.F.: Viewing nature scenes positively affects recovery of autonomic function following acute-mental stress. Environ. Sci. Technol. **47**, 5562–5569 (2013)

Chomątowska, B.: Betonia Dom dla każdego. Wołowiec, Wydawnictwo Czarne (2018)

Ciarkowski, B.: Modernizm po drugiej wojnie światowej - lata 1945–1989. In: Stefańki, K., Ciarkowski, B. (eds.) Modernizm w architekturze Łodzi XX wieku, pp. 125–200. Księży Młyn Dom Wydawniczy, Łódź (2018)

Clarke, A., Cheshire, L.: The post-political state? The role of administrative reform in managing tensions between urban growth and liveability in Brisbane, Australia. Urban Stud. **55**(16), 3545–3562 (2018). https://doi.org/10.1177/0042098017753096

Dziennik Łódzki 170, 07.20, p. 6 (1971)

Dziennik Łódzki 190, 08.11, p. 4 (1972)

Forsyth, A., Salomon, E., Smead, L.: Creating Healthy Neighborhoods. Evidence-Based Planning and Design Strategies. Kindle Edition. Taylor and Francis (2017)

Forsyth, A., Musacchio, L.: Designing Small Parks: A Manual for Addressing Social and Ecological Concerns. Wiley, Hoboken (2005)

Frank, L.D., Sallis, J.F., Conway, T.L., Chapman, J.E., Saelens, B.E., Bachman, W.: Many pathways from land use to health: associations between neighborhood walkability and active transportation, body mass index, and air quality. J. Am. Plann. Assoc. **72**(1), 75–87 (2006)

Gascon, M., Triguero-Mas, M., Martínez, D., Dadvand, P., Forns, J., Plasència, A., et al.: Mental health benefits of long-term exposure to residential green and blue spaces: a systematic review. Int. J. Environ. Res. Public Health **12**(4), 4354–4379 (2015)

Gehl, J.: Cities for People. IslandPress (2010)

Giles-Corti, B., et al.: City planning and population health: a global challenge. Lancet **388**(10062), 2912–2924 (2016)

Hanzl, M., Rembeza, M.: Urban form versus health of citizens. Evaluation of modernist housing in Lodz and Gdansk. Urban Planning (2022). In Press
Hillier, B., Hanson, J.: The Social Logic of Space. Cambridge University Press, Cambridge (2003)
Hirsch, J.A., et al.: Changes in the built environment and changes in the amount of walking over time: longitudinal results from the multi-ethnic study of atherosclerosis. Am J Epidemiol. **180**(8), 799–809 (2014)
Holden, M., Scerri, A.: More than this: liveable Melbourne meets liveable Vancouver. Cities **31**, 444–453 (2013)
Jackson, R., Dannenberg, A., Frumkin, H.: Health and the built environment: 10 years after. Am. J. Public Health **103**, 1542–1544 (2013)
Kaal, H.: A conceptual history of liveability. City **15**(5), 532–547 (2011)
Kaczynski, A.T., Potwarka, L.R., Saelens, B.E.: Association of park size, distance, and features with physical activity in neighborhood parks. Am. J. Public Health **98**(8), 1451–1456 (2008)
Knuiman, M.W., et al.: A longitudinal analysis of the influence of the neighborhood built environment on walking for transportation: the RESIDE study. Am. J. Epidemiol. **180**(5), 453–461 (2014)
Marselle, M.R., Stadler, J., Korn, H., Irvine, K.N., Bonn, A. (eds.): Biodiversity and Health in the Face of Climate Change. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-02318-8
McArthur, J., Robin, E.: Victims of their own (definition of) success: urban discourse and expert knowledge production in the Liveable City. Urban Stud. **56**(9), 1711–1728 (2019). https://doi.org/10.1177/0042098018804759
McCann, E.: Policy boosterism, policy mobilities, and the extrospective city. Urban Geogr. **34**(1), 5–29 (2013)
McCann, E.: Inequality and politics in the creative city-region: questions of livability and state strategy. Int. J. Urban Reg. Res. **31**(1), 188–196 (2007)
Mitchell, R., Popham, F.: Effect of exposure to natural environment on health inequalities: an observational population study. Lancet **372**(9650), 1655–1660 (2008)
Mumford, E.: Designing the Modern City: Urbanism Since 1850. Kindle Edition. Yale University Press (2018)
Oliveira, V.: Urban Morphology: An Introduction to the Study of the Physical form of Cities. Springer, Cham (2016). https://doi.org/10.1007/978-3-319-32083-0
Paul, A., Sen, J.: A critical review of liveability approaches and their dimensions. Geoforum **117**, 90–92 (2020). https://doi.org/10.1016/j.geoforum.2020.09.008
Saelens, B.E., Handy, S.L.: Built environment correlates of walking: a review. Med. Sci. Sport Exer. **40**(Suppl 7), S550–S566 (2008)
Sarkar, C., Webster, C., Gallacher, J.: Healthy Cities. Public Health through Urban Planning. Edward Elgar Publishing Inc., Northampton (2014)
Skibniewska, H., Bożekowska D., Goryński A.: Tereny otwarte w miejskim środowisku mieszkalnym. Warszawa, Arkady (1979)
Solarek, K.: Kształtowanie struktury przyrodniczej na tle koncepcji rozwoju i przekształceń współczesnego miasta. In: Szulczewska, B. (ed.) Osiedla mieszkaniowe w strukturze przyrodniczej miasta, pp. 24–45. Wydawnictwo SGGW, Warszawa (2015)
Sugiyama, T., Giles-Corti, B., Summers, J., du Toit, L., Leslie, E., Owen, N.: Initiating and maintaining recreational walking: a longitudinal study on the influence of neighborhood green space. Prev Med. **57**(3), 178–182 (2013)
Teo, S.: Political tool or quality experience? Urban livability and the Singaporean states global city aspirations. Urban Geogr. **35**(6), 916–937 (2014)
UN-Habitat: New Urban Agenda. Technical report, United Nations, New York (2016)
UN-Habitat: Broad-Based Partnerships as a Strategy for Urban Livability: An Evaluation of Best Practices. Technical report, United Nations, New York (2008)

Wetzstein, S.: Globalising economic governance, political projects, and spatial imaginaries: Insights from four Australasian cities. Geogr. Res. **51**(1), 71–84 (2013)
World Health Organization: Shanghai declaration on health promotion (2016)
World Bank: Livable cities for the 21st century. Directions in development. World Bank Group, Washington, DC (1996)
Zhan, D., Kwan, M.P., Zhang, W., Fan, J., Yu, J., Dang, Y.: Assessment and determinants of satisfaction with urban livability in China. Cities **79**, 92–101 (2018). https://doi.org/10.1016/j.cities.2018.02.025