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Research paper

ENCLOSURE OF PRIVATE OPEN AREAS OF GROUND-FLOOR APARTMENTS IN MULTI-FAMILY RESIDENTIAL BUILDINGS

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Abstract

Although many people prefer houses with a private yard for peace and greenery, the government's sustainable development policies promote compact cities with higher population density. In order to bridge the gap between user preferences and environmental goals, hybrid housing models are being developed that combine the advantages of private open space and dense urban environments. Private yards in ground-floor apartments give residents the feeling of living in a family house, serve as a green buffer zone that increases privacy and can significantly increase the value of the property. This paper applies a multi-layered methodological approach to the analysis of spatial characteristics and methods of enclosing private open areas on the ground floor of multi-family residential buildings. The focus is on contemporary, representative foreign examples that offer innovative spatial and programmatic solutions within the framework of common urban practice. The research analyzes the spatial, functional and visual relationships between the private gardens of the ground-floor apartments and their environment through the criteria of private-public relations, seclusion, security, microclimatic conditions. Certain demarcating patterns have been recognized, and their systematization can serve as a guideline for architectural design. The enclosing modalities observed in the analyzed examples are denivelation of the private open area level in relation to the surrounding terrain, fencing, application of greenery and various architectural elements. The analysis shows that the identified demarcating categories are most often combined in order to achieve a satisfactory level of openness/closure, privacy, protection and environmental comfort. The research also concludes that certain modalities, which are widely applied in European practice, may not be suitable for environments where the need for privacy is an integral part of the housing culture.

Key words: *Private Open Area, Ground-floor Apartment, Multi-family Housing, Enclosure*

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1. INTRODUCTION

A primary advantage of single-family houses over apartments is the private yard, which offers peace, quiet, and green space in suburban environments [1]. This non-compensatory housing feature is highly preferred by residents [2], making the private garden a critical criterion for evaluating residential quality and environment [3, 4]. Contrary to the wishes of the users for a green, peaceful settlement and a house with a garden, sustainable urban agendas frequently promote the compact city concept. By encouraging higher population density, mixed land use, and reduced car reliance, this urban model serves as a primary strategy to mitigate the environmental degradation caused by urbanization [5]. To bridge the gap between government policies and consumer housing preferences, hybrid residential concepts are emerging. These high-density models integrate the optimal features of both single-family and multi-family housing, effectively fulfilling the demand for private open spaces [3, 4].

As the direct connection of the unit to the ground is lost with the increase in the height of the building, it is quite clear that only apartments on the ground floor can have an associated open area in the form of different variations of yards. Allocating a piece of land directly in front of the window of a ground-floor apartment has multiple benefits. First, a residential unit in a multi-story residential building gets its own green oasis and extra space for outdoor activities, which are characteristics of a family house. Furthermore, the private open area distances the windows of the rooms on the ground floor from the public paths, thus acting as a kind of buffer zone and ensuring privateness. Finally, the application of this concept raises the value of the real estate and the ground floor, from an undesirable floor, becomes an attractive alternative to a family house.

Research on private gardens in multi-family housing remains scarce, with existing literature predominantly focusing on the general physical and psychological well-being benefits of domestic green spaces. Specifically, scholars note that gardens foster socio-ecological relationships [6], that their size dictates health outcomes [7], and that they serve as a critical space for conceptualizing 'home' in modern society [8]. Research also shows that units with an attached garden are particularly attractive to households with children [2]. On the other hand, although ground-floor apartments allow for private yards, research also indicates they suffer from reduced security, increased noise, and compromised visual privacy [9]. Furthermore, residents face persistent challenges, including limited shielding and excessive social interaction due to proximity to building entrances and shared spaces [10].

Western European residential buildings integrated ground-floor private yards over a century ago to counter industrial overcrowding and unsanitary conditions [11]. However, this concept only gained widespread European adoption late last century, evolving into a contemporary standard for modern residential design [12]. Although ground-floor apartments in Serbia historically faced low demand and lower prices, modern residential complexes have reversed this trend [13], driving interest in scarce ground-floor units with private yards. However, while these gardens enhance residential quality, lack of urban oversight often leads to aggressive enclosures—a

result of cultural, historical, and institutional factors that diverge from Western European practices.

This paper explores different designs for demarcating private open spaces of ground-floor apartments of multi-family residential buildings from public areas. The paper analyzes examples of contemporary trends in developed countries.

2. RESEARCH METHODS

In order to analyze the spatial performance and the way of enclosing the private outdoor areas of ground-floor apartments in multi-family residential buildings, a multi-level methodological approach was applied that combines theoretical analysis, a case study and morphological classification.

This paper analyzes contemporary design solutions, realized in environments where the implementation of a wide range of private open spaces on the ground floor represents an established urban planning and design practice. The selection of foreign examples is guided by the criterion of representativeness, with a focus on innovative spatial and programmatic solutions. The backbone of the research is the evaluation of the spatial and visual relationships between private open areas of the apartments on the ground floor and their immediate surroundings. During the evaluation, the criteria of visual and physical access, level of privacy, microclimatic conditions and security were applied.

The empirical data for this study consists of original photographic documentation collected during extensive fieldwork and study trips conducted between 2022 and 2026. The spatial focus of the field research encompasses Copenhagen (Denmark), Amsterdam (the Netherlands), Vienna (Austria), and Stockholm (Sweden). The systematic photographic recording targeted the methods of boundary demarcation and enclosure of private open spaces attached to ground-floor apartments in multi-story residential buildings. The research corpus includes over 50 analyzed case sites, built over the past two decades. Through a comparative analysis of this photographic database, recurring design patterns were identified. After a detailed analysis of spatial relations, the inductive method of classification was applied. The detected modalities of physical and visual separation of private gardens from semi-public and public spaces (for example denivelation, use of vegetation, transparent and non-transparent fences, architectural elements) were systematized. Based on these parameters, a typological classification of physical and visual barriers was formed, which can serve as a guideline for future architectural design. The chosen photographs are employed throughout the paper to elucidate the proposed typology and are not intended as individual subjects of analysis.

Although there is an evident difference in the level of publicness between the street, footpaths and the shared courtyard of a residential block [12], the research suggests that the way and degree of separation and enclosing of private open spaces of ground-floor apartments from public and semi-public spaces do not depend exclusively on this parameter. Therefore, the focus on these three key spatial interfaces did not serve as a basis for the subject typology, but it was carried out on the basis of spatial, functional and aesthetic characteristics.

3. RESULTS

The analysis of the selected examples shows several basic categories of enclosing the private open areas of the ground-floor apartments from the environment, namely denivelation, fencing, use of greenery and use of various architectural elements. The analyzed examples usually contain characteristics of several categories.

3.1. Denivelation

Planning the floor level of the ground-floor apartment above the level of the surrounding terrain is a common approach in the design of residential buildings. In addition to protection against moisture and atmospheric precipitation, this measure is also applied to achieve greater privacy of the residential unit. The latter also applies to the associated open areas of the apartment. However, a small denivelation (for example, less than half a meter), has a symbolic significance rather than ensuring privacy and security. If this measure is combined with other modalities and such elevated terrace is also enclosed with carefully selected greenery (Fig. 1a) or a non-transparent fence (Fig. 1b), then it is completely physically and visually protected. If the height of the barrier formed in this manner exceeds 1.5 meters relative to the public circulation area, it can be classified as a real security barrier, as in that case the open area and its amenities move out of the view of passers-by. When access to the unit is planned through the associated open area, there is an entrance gate within the fence itself, and several steps connect the public space with the private terrace.



Figure 1. Elevated open area level: a) Combined with greenery (Copenhagen, 2016), b) Combined with non-transparent fence and greenery (Copenhagen, 2017), c) Combined with a plant bed at the same level as public space (Copenhagen, 2016), d) Combined with bushy and shrubby greenery at the same level as public space (Copenhagen, 2008) (Source: Stoiljković)

The planning of the greenery in front of the raised private open space moves it away from the public space, which additionally contributes to achieving seclusion. The green area can be at the same level as the public area (Fig. 1c), in the form of a slope or a hill. How much privacy and protection will be achieved depends on the size of the green area and the type of greenery. Low vegetation (especially if the area under the greenery is wide) has more of a role in distancing passers-by from the terrace than creating a barrier to achieve privacy. The use of bushy and shrubby greenery forms an impenetrable barrier between public and private space (Fig. 1d), so a potential passerby cannot approach such a private terrace, and greater privacy is achieved. In addition, the presence of greenery makes the open area more pleasant to stay in.

3.2. Fencing

Placing a fence (or a railing) around the private open area of the ground-floor apartment aims to physically separate the associated open space from semi-public and public facilities in the immediate environment and depending on the height and design of the fence itself, visual protection. The use of a standard height railing (about 1 m) aims to provide safety and demarcate private and public space, rather than achieving intimacy and access control. Such open areas are still visible from adjacent public spaces, but it is clearly indicated where the public zone ends and where the private one begins (Fig. 2a). On the other hand, if the priority is to achieve increased privateness and security, which is most often the case when a private open area borders a busy street, a non-transparent high fence is installed, which makes it sheltered and peaceful (Fig. 2b).



Figure 2. Fencing of private open area: a) Standard height railing (Copenhagen, 2010), b) High non-transparent fence (Vienna, 2015), c) Partially enclosed terrace (Stockholm, 2007), d) Green area in front of the fenced terrace (Copenhagen, 2006) (Source: Stoiljković)

However, tall, solid boundaries around private ground-floor open spaces fundamentally reshape the streetscape, converting vibrant social spheres into mere transitional corridors. Streets with inactive, blank facades impose profound psychological, sociological, and aesthetic repercussions on the pedestrian experience—eroding the perception of safety, generating a monotonous and visually exhausting street front, and undermining social interaction.

If the intention is to experience the public space (most often a common courtyard) as a continuation of the private terrace, and to promote the "overflow" of outdoor activities from private to public open space, then it is only partially enclosed (Fig. 2c). In order to achieve a more pleasant environment, but also greater shielding, the installation of a fence can be combined with the introduction of greenery. Planning the green area in front of the terrace can further physically separate it from the public area (Fig. 2d), while the use of shrubby greenery or a hedge can additionally contribute to intimacy, but also to the improvement of microclimatic conditions.

3.3. Greenery

The use of greenery for the purpose of enclosing the associated open areas of ground-floor apartments has multiple significance. First, it is directly and indirectly beneficial for residents, because in addition to providing a physical framework for rest and recreation, it is responsible for improving aesthetics and regulating the microclimate.



Figure 3. Enclosing with greenery: a) Physical demarcation (Copenhagen, 2019), b) Combined with fence for security protection (Copenhagen, 2020), c) Dense vegetation for complete privacy (Vienna, 2015), d) Enclosing the terrace with a hedge (Copenhagen, 2018) (Source: Stoiljković)

Depending on the size of the plant bed, type of greenery, its size and quality, this kind of barrier can serve purely as a physical demarcation (Figure 3a), or as complete privacy

protection, with all possible modalities between these two cases. The width of the flowerbed, as well as the type and quality of plants, will affect the degree of privacy of the terrace. The narrow plant bed and low vegetation and bushes serve more as a boundary that separates what is private and what is public zone. To achieve greater privacy and protection from physical intrusion, in addition to the use of denser and higher greenery, this measure is often combined with the installation of a fence facing neighboring terraces or public circulation routes (Fig. 3b). With the increase in the width of the green belt in front of the private terrace, it moves away from public areas, and greater seclusion is achieved. The integration of dense vegetation not only creates a shaded, comfortable microclimate but also transforms the outdoor space into a fully screened, private domain. (Fig. 3c). The use of hedges is also a common approach in the enclosure of private terraces. They combine the characteristics of both fences and greenery and are therefore multi-purpose. They serve to demarcate private from public areas, and depending on their height and quality, they can also serve as a visual and intrusion-preventing barrier (Fig. 3d).

3.4. Various architectural elements

Placing planters with greenery around the ground-floor terrace also provides multiple benefits. Planters as architectural elements serve to demarcate public and private spaces, while at the same time the greenery grown in them provides visual protection and contributes to the creation of a pleasant environment. Smaller planters only have the role of physical demarcation between private and public areas, while perimeter defense and shielding cannot be achieved (Fig. 4a). If the goal is to achieve a more serious physical and visual barrier, larger planters are used, strategically placed so that the greenery in them protects the privateness of the terrace and apartment rooms (Fig. 4b). This measure is often combined with elevating the level of the terrace, which further contributes to the creation of a quiet and safe private outdoor space.



Figure 4. Enclosing with various elements: a) Small planters for physical demarcation (Copenhagen, 2017), b) Larger planters for greater privacy (Stockholm, 2018), c) Demarcation by different floor treatments (Amsterdam, 2010), d) Demarcation towards a neighbor (Copenhagen, 2016) (Source: Stoiljković)

Also the use of other architectural elements, such as gabions, awnings, movable screens, etc. can serve to separate the private open area from the public ones. Depending on their design, size and transparency, the physical separation is more or less pronounced, while privacy and protection are generally more difficult to achieve by applying these measures.

Within this category, examples should also be mentioned where there is no form of physical barrier between the private space of the terrace and the public surrounding space, but rather the terraces are demarcated from the surrounding only by a difference in floor treatment, which marks what is private and what is public area (Fig. 4c). In this way, the boundary between private and public space is blurred, the private open space is more tightly connected to the public space, and more intensive use of public space is encouraged and emboldened. This design approach has significant functional and spatial benefits, as the area available to users for outdoor activities is significantly increased. On the other hand, this architectural principle is not suitable for environments where the need for privacy is an integral part of the housing culture or where the safety of the residents would be endangered in this way. It is interesting in some examples of this type that despite the very discrete and vague demarcation of the belonging open space to the public space, the demarcation towards the neighbors is clearly expressed (Fig. 4d).

4. DISCUSSION

An analysis of selected case studies reveals that ground-floor private open spaces are typically enclosed through a combination of four primary methods: denivelation, fencing, landscaping, and use of various architectural elements.

Elevating the level of the associated open area in relation to the surrounding terrain is an effective method for demarcating private and public space, increasing privateness and safeguarding. In combination with a fence, green areas in front of an open space or dense vegetation, a pleasant environment can be created, completely visually and physically hidden from the public space. Placing a fence around the private open space on the ground floor primarily serves to physically demarcate zones, while the level of visual protection and access control directly depends on its height, transparency and eventual combination with greenery. Standard and partial fences clearly define the boundaries of the property without completely isolating it from the environment, which is suitable for the spatial interface between private terraces and shared yards, while high, non-transparent fences provide maximum shielding towards busy public spaces such as the street. The use of greenery for the purpose of enclosing private terraces on the ground floor is a multifunctional solution that, in addition to physical demarcation and visual protection, actively improves the aesthetics and microclimate of private open spaces. This measure is often combined with others, successfully balancing the need for intimacy, physical distance and improvement of microclimate conditions in the private outdoor space. The use of planters with greenery and other architectural elements provides multiple aesthetic and spatial advantages, but their effectiveness in achieving safeguarding and privacy directly depends on dimensions,

design and strategic positioning. The complete absence of physical barriers, where the demarcation of private and public space is done solely by different floor treatments, blurs the boundaries and creates a fluid, expanded space for outdoor activities, but directly sacrifices the privacy and protection of the occupants. This design is not applicable in environments with a housing culture that requires a high level of privacy, nor in environments where such a solution could threaten the safety of the occupants.

The difference in the perception and treatment of ground-floor open spaces between Serbia and Western European countries (such as Denmark and the Netherlands) is clearly manifested through contrasting spatial and socio-cultural patterns. While privacy in Serbia is primarily defined as complete physical isolation from the public sphere and freedom from visual intrusion, in Western Europe it is achieved through social integration and a visual dialogue with the surroundings. Consequently, the main motive for enclosure in the domestic context is the need for security—namely, defense against burglaries and noise—whereas Western European models treat fences through the lenses of aesthetics, landscape design, and microclimatic comfort. This approach directly shapes the attitude toward passersby: in Serbia, a pedestrian on the sidewalk is often perceived as a potential threat, whereas in Denmark or the Netherlands, they are viewed as an integral part of the local community. Finally, these differences are deeply reinforced by legal frameworks—weak institutional control and the toleration of unauthorized modifications in Serbia enable aesthetic anarchy along street fronts, in sharp contrast to rigorous Western European regulations that strictly dictate the permitted height, materialization, and transparency of fences.

5. CONCLUSIONS

While sustainable compact city models demand high-density multi-family housing, user preferences heavily favor individual homes with private yards. To accommodate urban population growth, contemporary architecture must balance high density with private green spaces. Multi-story residential buildings with different types of private ground-floor open areas provide an effective model to reconcile these conflicting demands.

This research analyzes the modalities of enclosure of ground-level open spaces in multi-family residential buildings, relying on primary empirical data collected through several years of study tours. Based on the rigorous analysis and evaluation of these representative examples, a comprehensive typological classification of visual and physical barriers was established. The identified and systematized typologies of private space enclosures can serve as a robust analytical basis for formulating precise design guidelines in architectural practice.

The primary limitation of this work lies in the contextual specificity of the developed framework, which may not be directly transferable to the Republic of Serbia due to distinct institutional and socio-cultural factors. Consequently, future research is required to adapt these guidelines, ensuring their feasibility and relevance within the domestic planning and legislative landscape.

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