

Recognising the Development Potential of Housing Estate in-between Spaces: Typology, Scenarios and Regeneration Strategies

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Late-modernist housing estates represent a dominant residential typology in Central European cities; however, their standardized and technocratic planning often resulted in the formation of undefined and functionally ambiguous open spaces. These in-between spaces, created as byproducts of post-war mass housing construction, frequently remain underused despite their strategic position within the residential structure. This paper investigates the development potential of housing estate gaps and explores their transformation into active and meaningful public environments. The research combines field mapping, spatial analysis, and typological classification with the creation of a working database documenting spatial characteristics, current uses, and external interventions. Based on this framework, a set of development scenarios and a catalogue of regeneration solutions are proposed. The concept of inward-oriented development, which understands the intensification and structuring of open space as a means of improving spatial quality rather than its simple preservation is central to the approach. The methodology is demonstrated through a case study of the Jahodníky – Ladoveň housing estate in the city of Martin, Slovakia. The results show that in-between spaces can accommodate a wide range of community, recreational, ecological, and identity-forming functions. Small-scale, context-sensitive interventions are capable of transforming residual areas into legible, multifunctional, and socially embedded public spaces. The paper argues that systematic recognition and activation of these micro-spaces represents an effective tool for enhancing the everyday living environment and strengthening the identity of housing estates without the need for large-scale redevelopment.

Keywords: housing estate, in-between spaces, urban voids, urban gaps, scenario-based design

1 Introduction

Large housing estates constructed during the second half of the twentieth century constitute a fundamental layer of the urban structure of Central and Eastern European cities. These residential complexes were primarily developed as a rapid response to post-war housing shortages and were based on principles of typification, prefabrication, and industrialised construction. While this approach enabled the efficient production of large numbers of dwellings, it also led to a technocratic understanding of urban form in which qualitative aspects of spatial composition and everyday use were frequently subordinated to quantitative performance. One of the most persistent spatial consequences of this model is the emergence of undefined and functionally ambiguous open spaces located between apartment

buildings. These in-between spaces did not arise as intentionally designed public areas (Gutman, 2022), but rather as residual products of building layouts, rotations of housing blocks, and standardised spacing rules. Housing estates were thus often realised without traditional urban elements such as streets, squares, or clearly articulated transitions between public, semi-public, and private realms. As a result, numerous small-scale gaps and micro-spaces appeared within residential structures, lacking clear programmatic designation or symbolic meaning (Vaculová & Štěpánková, 2017). Such spaces can be understood as a specific form of urban voids or inner peripheries embedded inside otherwise densely inhabited environments. Contemporary urban theory increasingly recognises these “places between places” as a blind spot of planning practice, despite their spatial,

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social, and ecological relevance (Haluzík et al., 2021; Fornal-Pienak & Bihuňová, 2022). Although frequently perceived as empty, neglected, or insignificant, these areas represent latent spatial reserves with the capacity to support new forms of everyday use, social interaction (Prochnow & Čibík, 2022), and local identity.

Previous research by the author (Čibík, 2024) has shown that in-between spaces occur in various morphological configurations and scales, ranging from narrow gaps between building wings to enclosed courtyard-like micro-spaces or larger undeveloped plots within housing estates (Čibík, 2024). Their heterogeneity makes it difficult to establish a single universal typology; however, recurring spatial scenarios can be identified through systematic mapping and graphical interpretation. These scenarios provide an important basis for understanding how such spaces function and how they may be transformed. In the context of contemporary housing estate regeneration, there is a growing shift from large-scale demolition or comprehensive redevelopment towards incremental and small-scale interventions. These approaches focus on activating existing spatial resources and improving spatial quality through targeted, context-sensitive actions. Rather than expanding housing estates outward, this perspective can be described as inward-oriented development, in which spatial intensification and selective infill serve as tools for strengthening internal structure and legibility (Čibík et al., 2020). Paradoxically, reducing the amount of undefined open space by introducing new functions and spatial articulation may lead to higher environmental quality and usability (Tóth, 2022; Pochodyła et al., 2022).

The aim of this paper is to investigate the development potential of housing estate in-between spaces and to propose an application-oriented framework for their regeneration. Building on field mapping, typological analysis, and a working database of identified spaces, the research formulates development scenarios and a catalogue of regeneration solutions. The methodology is demonstrated through a case study of the Jahodníky – Ladoveň housing estate in the city of Martin, Slovakia. This paper builds upon and further develops the author's previous research on residential in-between spaces (Čibík, 2025; Čibík et al., 2023). By systematically recognising and activating these micro-spaces, housing estates can be gradually transformed into more legible, multifunctional, and socially embedded living environments. The paper argues that such targeted interventions (Čibík & Jankechová, 2023) represent an effective and economically feasible pathway towards enhancing everyday spatial quality and strengthening the identity of late-modernist residential areas.

2 Material and Methods

The research is based on qualitative field mapping and observation of housing estate in-between spaces within a selected case study area. The main objective was to identify and analyse residual open spaces with potential for social and aesthetic revitalisation and to explore possibilities for their functional activation.

The following research questions were formulated:

- What typological scenarios of in-between spaces occur within the Jahodníky – Ladoveň housing estate?
- How do these spaces differ in terms of permeability, presence of external interventions, and current use?
- What types of interventions can contribute to improving their functionality and spatial identity?

Methodologically, the research was structured into four main steps:

1. Analysis of cartographic materials and selection of potential in-between spaces based on criteria of openness and non-development.
2. Field observation and photographic documentation.
3. Categorisation of in-between spaces according to defined scenarios.
4. Development of a catalogue of regeneration solutions based on typology and functional priorities.

2.1 Scenarios of In-Between Spaces and Causes of Their Emergence

In-between spaces take diverse forms and scales, ranging from small neglected land remnants to larger undeveloped plots. These spaces are characterised by a set of attributes such as size, shape, origin, former and current function, and ownership relations. For the purposes of introductory mapping within long-term multi-level research, it was necessary to define which spaces could be included in a working database.

Initial phases of the research revealed that it is not possible to establish a single, universally valid typology of in-between spaces. Therefore, this study applies a scenario-based approach that categorises spaces according to their spatial position within the urban structure:

- City centre – compact urban structure, including historical cores and dense built-up areas; in-between spaces occur mainly as gaps created by demolition, natural disasters, urban development processes, political or economic decline, or planning failures.
- Inner city – interior spaces of housing estates, campuses, large residential complexes, and transitional zones between the city centre and peripheral areas.

- Outer city and peripheral zones – industrial areas and their internal structure, brownfields, and open undeveloped land.

The present paper focuses on the category of inner-city in-between spaces, specifically housing estate in-between spaces.

2.2 Origins of Housing Estate in-Between Spaces

The emergence of housing estate in-between spaces is closely related to the typification of residential buildings and principles of industrialised construction. At the onset of mass housing production, the main objective was to reduce costs and construction time through repeated use of standardised designs and efficient layouts. Residential buildings were placed within large open areas and conceived as uniform structures, reflecting the prevailing idea of social equality. Industrial production models such as Fordism and Taylorism influenced the organisation of construction processes, leading to the minimisation of design variation and the prioritisation of efficiency (Řepková, 2022). Although architects often emphasised the importance of spatial quality, industrial practice responded only marginally. More successful environments were achieved primarily through urban design concepts rather than architectural refinement.

Overscaled residential blocks were arranged in various configurations – linear, L-shaped, Y-shaped, or irregularly rotated – which created intimate micro-spaces but also numerous residual areas without defined functions (Fig. 1). These gaps can be interpreted as unintended byproducts of spatial composition rather than deliberately designed public spaces.

Housing estate in-between spaces can be illustrated through the work of architect Michal Maximilián Scheer,

who between 1963 and 1969 designed, together with his team, the housing estate Chrenová I in the regional city of Nitra, Slovakia. The estate consists of standardised low-rise apartment buildings with four storeys, arranged into a Y-shaped ground plan that forms a hexagonal courtyard (Nitrianske kultúrne dedičstvo, 2020). Scheer sought to create a “calm green place” enclosed by residential buildings while maintaining spatial continuity with the surrounding environment. At the junction of three prefabricated apartment blocks, an enclosed triangular in-between space was created, which he conceived as a transitional area (Novák & Pročka, 2016). The proposed arrangement allows apartment buildings to be repeatedly added in an almost unlimited manner, resulting in an urban structure reminiscent of “cells of a honeycomb” – a metaphor comparing collective human living to the perfectly functioning life of bees. A second building type within the estate consists of high-rise apartment blocks grouped in clusters of three. On each floor, in-between spaces were incorporated and intended for community use, supporting encounters and social interaction among residents (Nitrianske kultúrne dedičstvo, 2020). A comparable approach can be observed in the housing estate Medzi Jarkami, designed by architects Štefan Svetko and Štefan Ďurkovič, where panel blocks were rotated to create compact and intimate spatial configurations. The resulting in-between spaces were used primarily for the placement of communal waste containers. Another example of utilising voids between buildings can be found in the Sekčov housing estate in Košice, where these spaces function as areas for collecting runoff water from adjacent slopes and directing it into drainage systems.

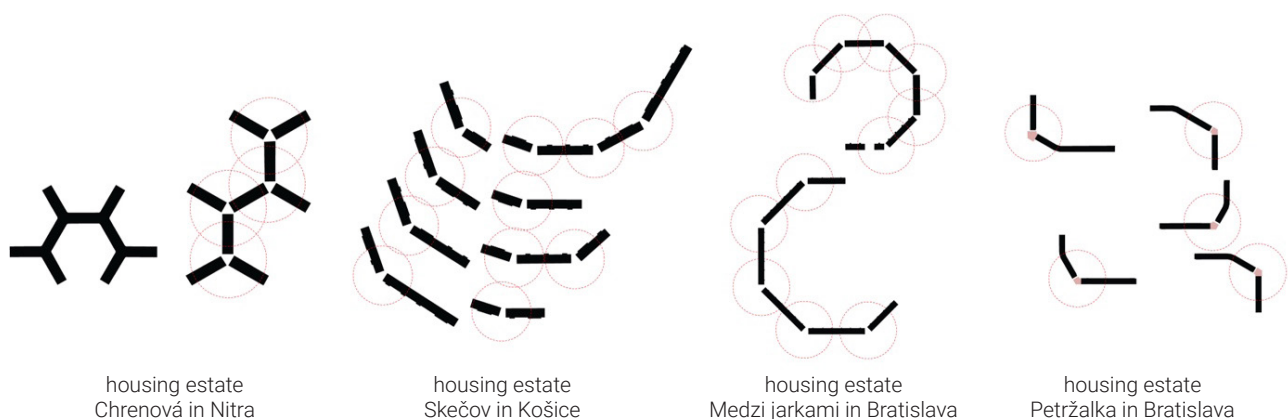


Figure 1 Analysis of housing estate structures

Source: Plánková & Čibik, 2024

Diagrammatic representations of selected Slovak housing estates illustrating typical spatial configurations and building arrangements that generate in-between spaces: Chrenová in Nitra, Sekčov in Košice, Medzi Jarkami in Bratislava, and Petržalka in Bratislava. The schemes highlight repetitive structural patterns, rotations of building blocks, and junction points where residual and interstitial open spaces emerge

2.3 Typological Scenarios of Housing Estate in-Between Spaces

Based on graphical interpretation and field observation, five representative scenarios (Fig. 2) of housing estate in-between spaces were identified. These scenarios represent simplified graphic abstractions of the most frequent spatial situations observed in housing estates and are derived from the relative position, orientation, and mutual distance of residential buildings (Fig. 3). Their actual morphology may vary depending on local conditions and specific urban contexts.

- Scenario 1: Transitional space between two buildings – a narrow passage divided into several small segments, which limits coherent design and usually accommodates only scattered greenery.
- Scenario 2: Non-permeable micro-space between two buildings – a typical housing estate in-between space where no infill occurred; provides intimacy and potential for residential and recreational use.

- Scenario 3: Permeable gap between two building elements – open from both sides, forming a micro-space that cannot be built upon.
- Scenario 4: Infill between building elements – usually a single-storey structure; ground floor may remain permeable while upper level occupies the plot, allowing vertical layering of functions.
- Scenario 5: Large semi-permeable open space – offers the greatest capacity for diverse activities; pedestrian routes are typically led along the building edge rather than through the centre.

2.4 Case study area: Jahodníky – Ľadoveň Martin (Slovakia)

For empirical observation, the Jahodníky – Ľadoveň housing estate in the city of Martin, Slovakia, was selected. Martin is a regional centre in northern Slovakia and historically recognised as a centre of Slovak national culture. The city consists of seven urban districts and six

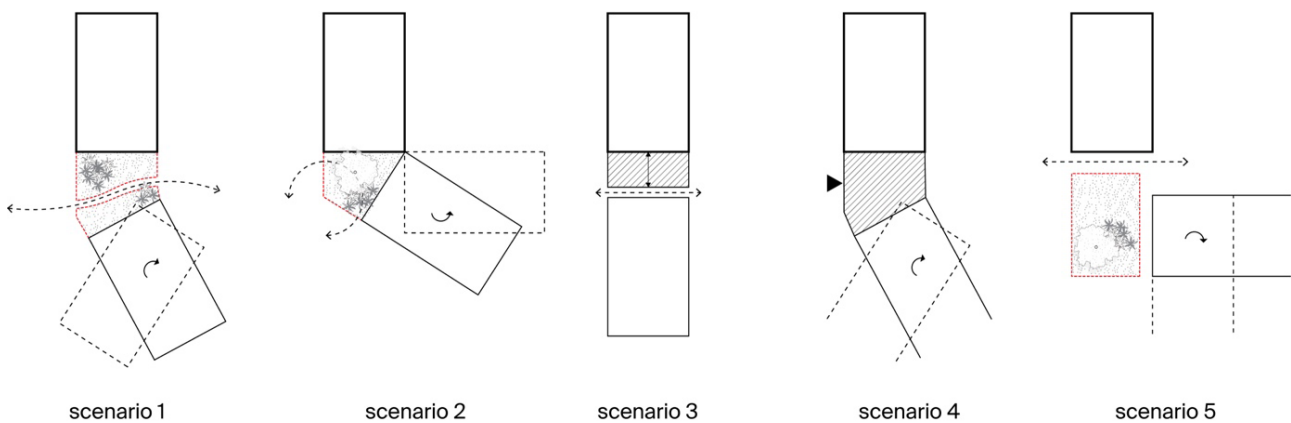


Figure 2 Typological scenarios of housing estate in-between spaces

Source: Plánková & Čibík, 2024

Diagrammatic schemes illustrating five recurrent spatial scenarios based on the relative position, permeability, and mutual orientation of residential buildings. The diagrams show how rotations, offsets, and distances between apartment blocks generate different types of in-between spaces, ranging from narrow transitional gaps to larger semi-permeable micro-spaces with varying development and functional potential

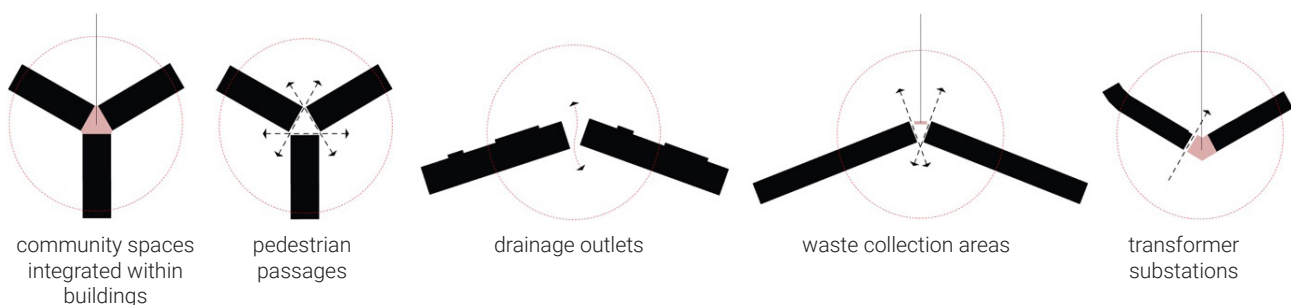


Figure 3 Typical functions occurring within housing estate in-between spaces

Source: Plánková & Čibík, 2024

Diagrammatic representations of recurrent functional uses identified within in-between spaces, including community spaces integrated within buildings, pedestrian passages, drainage outlets, waste collection areas, and small technical infrastructure such as transformer substations. The diagrams illustrate how functional demands and technical requirements influence the spatial character and utilisation of these micro-spaces

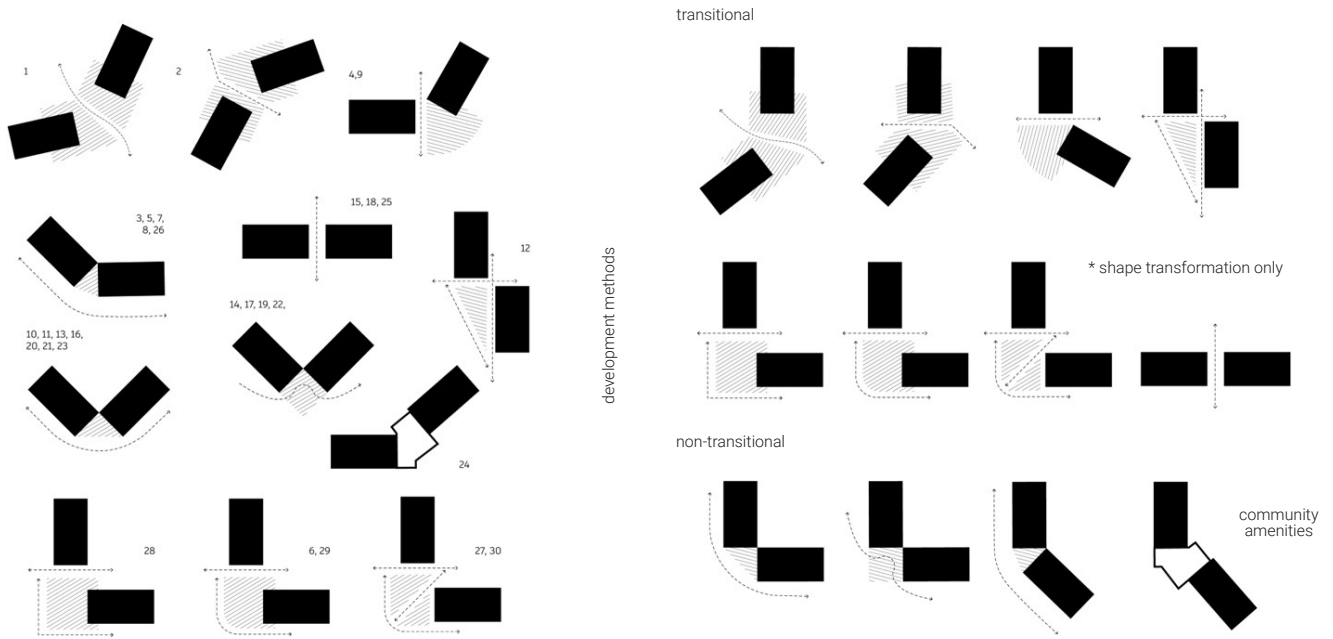


Figure 4 Methodological classification of housing estate in-between spaces
 Source: Plánková & Čibík, 2024
 Diagrammatic overview of identified in-between spaces from the Jahodníky – Ľadoveň housing estate grouped according to transitional (permeable) and non-transitional (non-permeable) spatial conditions. The schemes illustrate variations in building orientation, mutual positioning, and shape transformations, which form the basis for scenario classification and subsequent development of regeneration strategies

SPACE CODE: **SM_07**
 LOCATION: Lermontova street
 GPS COORDINATES: 49.053642, 18.927715
 SCENARIO: 2
 PRESENCE OF EXTERNAL INTERVENTIONS: noy

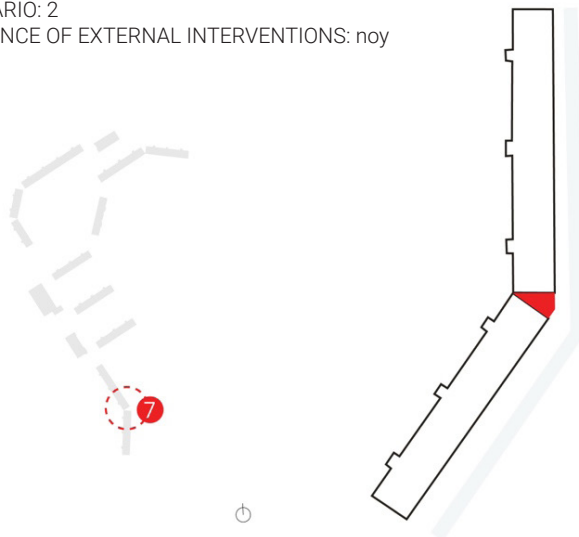


Figure 5 Example of a working card for a housing estate in-between space
 Source: Plánková & Čibík, 2024
 The card documents basic identification data, including space code, location, GPS coordinates, assigned scenario type, and presence or absence of external interventions, together with a schematic plan and photographic documentation. Working cards were created for each recorded in-between space and served as a basis for typological classification and further analytical processing

major housing estates, of which Jahodníky – Ľadoveň is the largest. The selection of this housing estate was motivated by its high diversity of in-between spaces, heterogeneous building structure, and architectural variability. The first step consisted of identifying all potential in-between spaces on mapping materials. Subsequently, field surveys were conducted to verify their existence and relevance. Spaces exceeding the scale of in-between spaces or merging into large open areas were excluded. As a result, a working database of 30 housing estate in-between spaces was established (Fig. 4). For each space, a working card was created (Fig. 5) containing location data, GPS coordinates, area size, scenario type, assessment of external interventions, map extract, spatial scheme, and photographic documentation. The database serves as a foundation for further analysis and future research updates.

3. Results and Discussion

3.1 Catalogue of Regeneration Solutions

The catalogue presents sixty possible regeneration solutions developed primarily for scenario no. 2 (non-permeable micro-space between two buildings), while remaining applicable – through adaptation – to other typological scenarios of housing estate in-between spaces. The solutions are structured into three main categories:

1. Forms of greenery, introducing ecological, stabilising, hygienic, aesthetic, and productive functions.
2. Community-supporting spaces, providing facilities for social interaction, neighbourhood activities, and shared use.
3. Spaces of anonymity, offering opportunities for individual stay, contemplation, or artistic expression.

The objective of the catalogue is to create attractive places that are inclusive not only for a broad public but also for individuals. For this reason, some proposals are formulated as conceptual or poetic visions, while others represent practically applicable intervention models. The focus is not placed on the architectural form of buildings, but rather on the spatial content and the meaning embedded in the space. In this context, the form of housing blocks is considered secondary to the quality of the environment created between them. The proposed solutions range from minimalist adjustments to more invasive interventions that may affect façades, roofs, or ground floors of residential buildings. The catalogue is further divided into seven thematic groups: mass and structure, sport, play, art, operation, recreation, and forms of greenery. Together, these groups cover a wide spectrum of possible activities and spatial atmospheres. From a critical perspective,

the catalogue demonstrates that even small-scale and low-cost interventions are capable of generating substantial improvements in spatial quality. At the same time, it highlights the importance of combining functional performance with symbolic and aesthetic dimensions in order to achieve long-term acceptance and use.

3.2 International Inspirational Framework

The proposed categories and solutions draw inspiration from international examples of regeneration of modernist housing estates and inner-block spaces. In several European countries, similar strategies have proven effective in revitalising neglected in-between or residual spaces.

- In Germany, the category of art and anonymity is often represented through the concept of Kunst am Bau (art in public space), where overlooked corners of housing estates are transformed into small cultural oases with temporary or permanent artistic installations, for example in Leipzig or the Marzahn district of Berlin.
- In the Netherlands, emphasis is placed on recreation and community, frequently through shared backyards and zoning for calm leisure activities. Examples from Amsterdam and Utrecht show that even minor interventions such as seating, shading, or urban furniture can significantly improve spatial quality and everyday usability.
- In Poland, a “quiet redesign” approach is commonly applied, focusing primarily on forms of greenery and recreation, for instance through community gardens, rain gardens, or modular parklets introduced without structural intervention into buildings. Comparable examples can be found in Warsaw and Gdańsk.
- In the Czech Republic, participatory models of designing playgrounds, community courtyards, and micro-piazzettas are increasingly promoted within the categories of play, sport, and operation, often through cooperation between municipalities and local initiatives, as documented in programmes implemented in Brno and Prague.

These examples demonstrate that even within highly typified and schematic housing estate structures it is possible to introduce solutions that combine pragmatism with aesthetics, function with meaning, and community life with individual experience. The presented catalogue (Fig. 6) builds upon this international context while responding to local spatial and social conditions.

3.3 Mutual Interactions and Functional Networking

Based on analyses of the current state of amenities within the Jahodník – Ľadoveň housing estate, the research

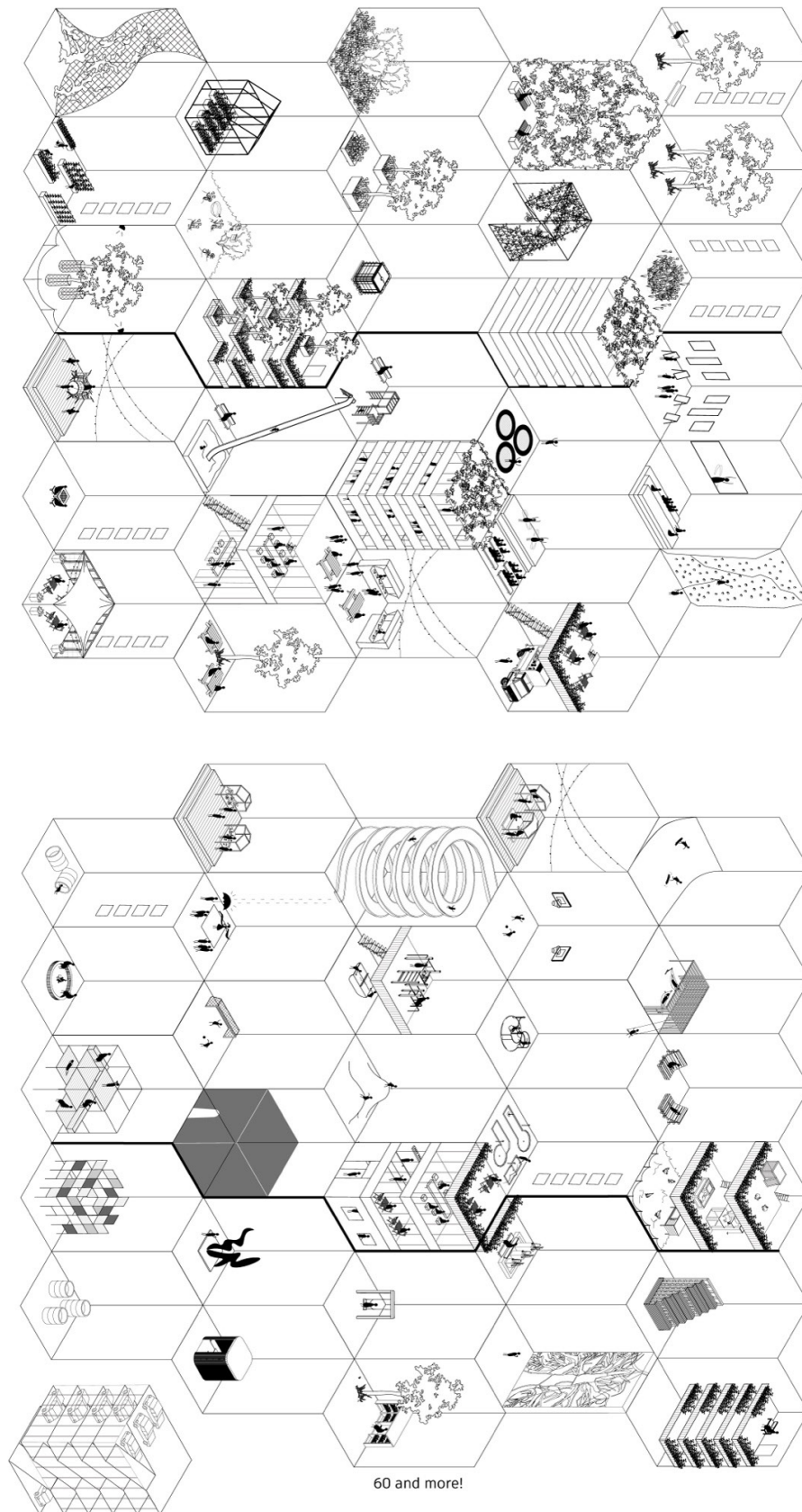


Figure 6 Catalogue of regeneration solutions for housing estate in-between spaces
Source: Plánková & Čibík, 2024
Axonometric diagram presenting a selection of conceptual and practical interventions organised into thematic categories such as forms of greenery, community-supporting spaces, spaces of anonymity, recreation, play, sport, art, and small-scale architecture

identifies a lack of complementary activities and services. Housing estate in-between spaces are therefore understood as potential nodes of a functional network capable of supporting overall regeneration. Modelled placement of activities from the catalogue demonstrates how individual spaces can interact and form a coherent functional system. Rather than defining a single central core of amenities, the research focuses on a group of in-between spaces that mutually reinforce each other and collectively operate as a platform for diverse programmes and activities.

The functional logic of the network follows two main spatial roles:

- Permeability spaces located mainly at the edges of the housing estate, acting as inviting and attention-attracting places. These spaces introduce users to the internal network and guide them towards areas with richer functional content. Typical functions include artistic elements, temporary installations, small-scale architecture, and anonymous spaces for individual retreat.
- Community spaces concentrated towards the inner parts of the housing estate, offering facilities for neighbourhood meetings, cultural activities, leisure, missing services, and everyday social interaction.

This network-based approach can be interpreted as a manifesto demonstrating how neglected micro-spaces may be systematically reactivated and integrated into everyday life. By forming a constellation of mutually connected places, in-between spaces gain new visibility and meaning, becoming an essential component of the housing estate's public realm.

4 Conclusions

This research understands housing estate in-between spaces as specific urban units with a pronounced potential for transformation into functional and aesthetically valuable elements within the otherwise uniform environment of late-modernist housing estates. These frequently overlooked and underused spaces – conceptualised in the text as “light oases” – can serve as orientation points that not only improve the legibility of urban structure but also contribute to its differentiation and hierarchical organisation. The revitalisation of in-between spaces can lead to the creation of functionally and socially attractive zones that complement missing elements of local amenities and significantly enhance residents' quality of life. The strategic aim of the research is to transform previously neglected micro-spaces into dynamic centres offering a wide range of activities, from recreational and social to cultural and community-oriented uses. Such transformation increases functional

diversity within housing estates and contributes to their partial self-sufficiency, reducing residents' dependence on central urban areas.

From an urban design perspective, the regeneration of these spaces has the capacity to establish a hierarchical network in which in-between spaces operate as secondary centres embedded within the housing estate. Their integration into the public realm improves spatial orientation in extensive and often monotonous residential structures while supporting their internal differentiation. Beyond functional extension, in-between spaces can become carriers of local identity, thereby increasing the cultural value of housing estates. From a social perspective, revitalised in-between spaces provide opportunities for everyday encounters, informal meetings, community-building, and strengthening neighbourly relations. They can host small events, cultural activities, and leisure programmes, contributing to a stronger sense of place that is often lacking in large-scale residential environments. From an aesthetic perspective, in-between spaces represent an opportunity for architectural and urban innovation. They may be conceived as spatial, artistic, or design interventions that enhance visual quality and enrich the overall cultural and aesthetic expression of housing estates.

The research focused on the Jahodníky – Ladoveň housing estate in Martin, where field surveys and graphical interpretations were used to develop regeneration scenarios for in-between spaces. The analysis and categorisation of these urban voids revealed their diverse forms and functional possibilities. The study introduced a catalogue of solutions including forms of greenery, community spaces, and artistic interventions. These proposals are transferable to different types of in-between spaces and enable the creation of a functional network connecting individual locations into a coherent system.

In conclusion, the revitalisation of housing estate in-between spaces represents not only an urban design challenge but also an opportunity for architectural, social, and cultural innovation. Transforming forgotten residual spaces into active and meaningful places can improve everyday living environments, strengthen community life, and support the long-term sustainability and identity of housing estates. This research provides a foundation for further studies and practical applications aimed at the regeneration of late-modernist residential environments. The proposed framework may also be applicable to other late-modernist housing estates in Central and Eastern Europe with comparable spatial and socio-urban conditions. The presented application-oriented framework is grounded in an extensive empirical base developed through diploma-level research and demonstrates how academic design exploration can be

translated into transferable planning and design tools (Čibík & Plánková, 2024).

Acknowledgments

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