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The Urban Heritage of the Diósgyőr–Vasgyár Ironworker's Colony

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Abstract: The following research was conducted mainly with the motive for creating an urban heritage proposal in Hungary, in the city of Miskolc. The area of focus was the former ironworker's colony of the Diósgyőr-Vasgyár region. The historical urban development of the ironworker's colony is examined here. Emphasis is given to to the preservation of the unique architectural styles and urban fabric of the colony. Additionally, an assessment is undertaken about the colony's building conditions and a plan was created for strategic preservation. It is to be combined with adaptive interior building modifications for the purpose of improving living standards for occupants. The research also takes into account meeting modern-day living needs in the space of historical urban heritage preservation.The urban heritage legislation of Hungary that is relevant to this research has also been outlined here. The ultimate objective is to simultaneously preserve the colony's historical prestige and satisfy contemporary needs thus making this research a very useful guide for situations involving urban heritage conservation within evolving urban settlements.

Keywords: Diósgyőr, Diósgyőr–Vasgyár, Ironworker's Colony, Miskolc, Urban Heritage, Building Heritage, Building Preservation, Urban Heritage Preservation.

Introduction

This proposal first explores the abundant history of Diósgyőr ironworker's factory and colony. Being founded in the 1700s, it underwent notable expansions in the 1800s. This provides the necessary context for the heritage research in the Diósgyőr-Vasgyár colony. The aim of this research is to preserve the ironworker colony's valuable architectural heritage and simultaneously adapting the building ensemble for modernised 21st century living. The purpose of the adaptive reuse is to solve issues brought about due to seasonal occupancy of homes, existing building modifications and seasonal occupancy of homes. This study assesses existing literature pertaining to the preservation of urban heritage, emphasizing a balance of modernization and historical preservation. Additionally, this heritage proposal was carried out with the concurrent revitalization of the Diósgyőr-Vasgyár colony. The undertaken research is thus a useful guideline and theoretical framework for experts dealing with the urban preservation and revitalization project of the ironworker's colony and its surrounding areas. The significance of this research undertaking is the model that it offers for post-industrial site revitalization, due to the harmonization of urban heritage conservation and meeting ever-changing urban needs.

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1. Literature Review- Historical Analysis

1.1. The Diósgyőr Steel and Iron Works

The steel and iron industry of Diósgyőr was founded in the 1700s and expanded in the 1800s with significant changes, similar to that of the European industrial revolution [1]. The area paints a sophisticated representation of industrialisation. It brings together technological innovation, economic growth and the remarkable impacts within local Hungarian communities [1].

First establishment and growth

Henrik Fazola, in 1765, saw great potential in areas rich with natural resources such as the iron ore abundant areas of Nekézseny, Uppony and Tapolcsány [1]. Fazola ultimately decided to construct the ironworks in the valleys of Szinva and Garadna due to the strategic location of the area, the abundant raw materials and the logistical advantages [1]. The new steelworks factory was to be constructed further down in the valley from the earlier ironworks, specifically located between Diósgyőr and Miskolc, on the right bank of the Szinva stream [2, p. 9]. The older ironworks in the upper valley was privately owned, however, the new steelworks were a significant public investment that was supported by the minister of finance, Lónyay Menyhért [2, p. 9]. Being a former locksmith, Fazola was equipped with the adequate entrepreneurial knowledge and technical expertise to initiate such an endeavour [1].

Facilities construction

Fazola initially created a huge smelter at the Felső-Hámor, which formed the basis for the initial setup of the ironworks [1]. Minor furnaces were also created to meet the needs of other various ironworking operations, which allowed for a more diverse production output and potential for the ironworks within the Szinva valley [1]. The operational output of the factory was also enhanced by the rolling mill which was created in close by gorge [1]. All of the infrastructure were thus used for many motives [1].

Local resource utilization

By making use of nearby resources, Fazola was able to increase industrial output and efficiency via the reduction of logistical complications and the cost of transportation [1]. Fazola's profound knowledge of the region's future industrial prospects were economically ingenious and formed a critical part of the initial stages of expansion for the factory [1].

Initiating the foundations for future expansion

In the early stages, the resource utilization, infrastructure and tactical position made for a sound foundation for the factory, which ultimately placed it to become a leading actor in the region's up and coming industrial space [1]. In 1900, the ironworker's colony was considered as the most exemplary colony of the monarchy [2, p. 14]. It boasted modern and comfortable homes and facilities such as

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schools and baths [2, p. 14]. The Diósgyőr ironworks was built on a large investment, with the total value of the factory and mines being 4.3 million forints and its material stock was worth 2 million forints [2, p. 13]. In 1891, the net annual turnover of the facility was 855 761 forints [2, pp. 13-14]. The work of Fazola at the Diósgyőr ironworks formed a framework which served as the basis for future technological innovation and expansion.[1].

The industrial surge of the 1800s

Due to an upsurge in the need for steel and iron across Europe in the 19th century, the Diósgyőr industry was at the forefront of this boom [1],[3]. During this period, the factory saw a notable expansion which enhanced the capacity for production further and also changed the steel and iron industry's technological environment [1],[3]. It is also worth noting that the upgrading of the factory was, apart from market demands, an attempt to become an ironwork's industrial leader in European markets [1], [2].

Methods

Many strategies were used to create a comprehensive outlook of the urban heritage in question. These included collaborative, theoretical and practical frameworks. Multiple strategies were employed, which included theoretical, practical and collaborative frameworks, in order to provide a holistic urban heritage analysis. The ensuing approaches were carried out:

- Archival investigation: An analysis of existing literature was done into how past and overall development of the Diósgyőr-Vasgyár domain. In this historical analysis, an emphasis was placed on how the steel and iron industry evolved and the subsequent consequences of this on the urban fabric of the area.
- Collaboration with NGO: A collaborative effort was made with professionals of the NGO working on the urban revitalization project of the ironworker's colony and its associated areas for guidance, tutelage and mentoring during the compilation of the urban heritage proposal.
- Urban Fabric Assessment: Evaluation of the colony's urban layout, including the classification of building types and conditions, and analysis of changes over time.
- Preservation Recommendations: Development of preservation strategies, considering legislative compliance, principles of minimal intervention, compatibility, and reversibility.
- Adaptive Reuse Strategies: Formulation of adaptive reuse recommendations for the colony's buildings, focusing on enhancing living conditions while preserving historical integrity.
- Community Engagement and Surveying: Involvement of local residents through questionnaires and surveys to understand their needs and preferences for adaptive reuse.
- Site Surveys and Assessments: Physical surveys of buildings, including structural assessments, architectural assessments and condition mappings of the colony buildings.

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Findings- Urban Heritage Analysis

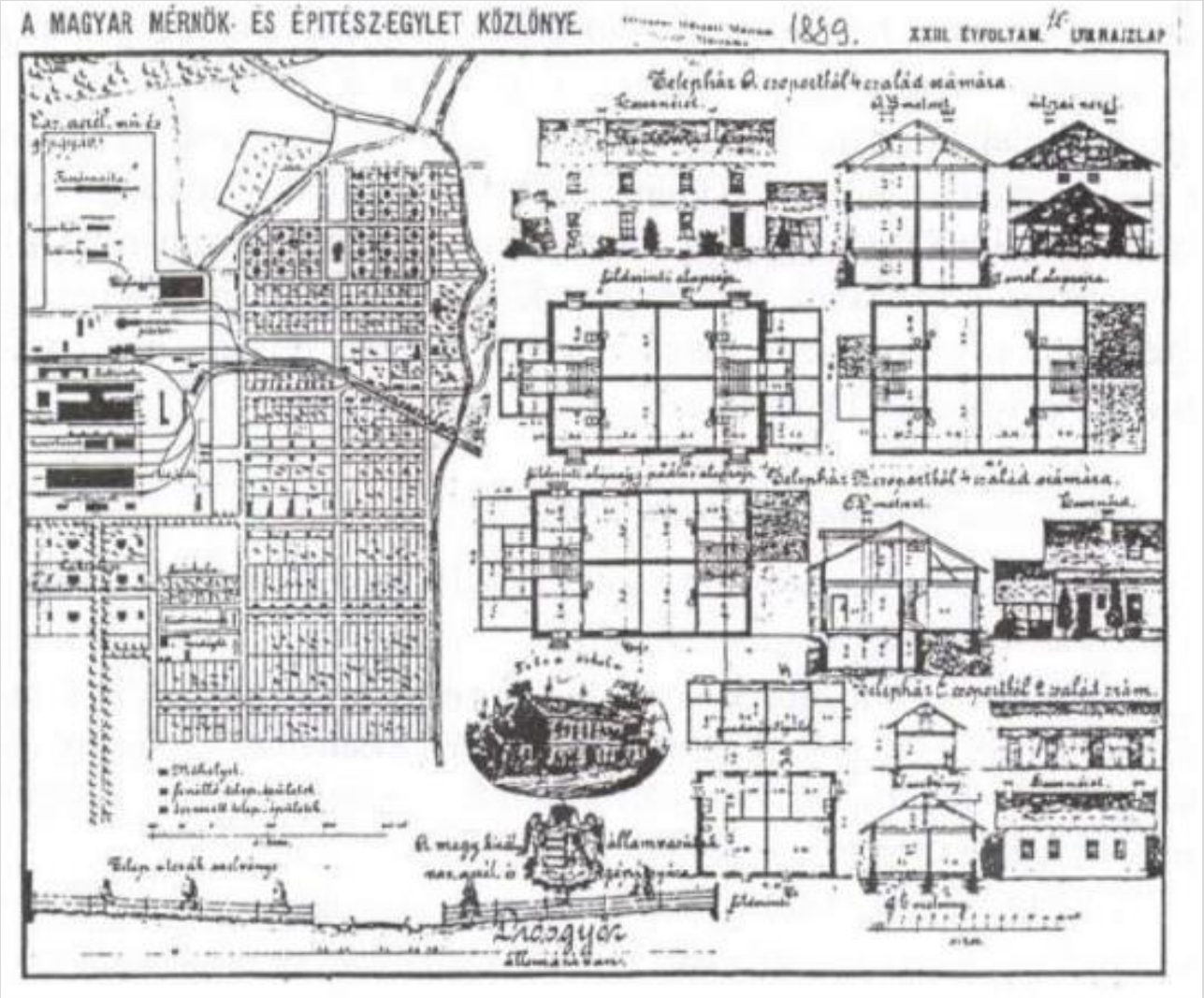

Figure 1: Plan of colony -1889

Source: Plan and cross-sectional diagrams taken and adapted from [2, p. 33]

2. Urban fabric

Development only began on a small-scale at the start of the 19th century, with the creation of the railway network passing through Diósgyőr-Vasgyár, and its associated infrastructure, heading toward Diósgyőr. In the late 19th century, the ironworker's colony was created alongside the steel factories.

The plans indicate a structured approach toward the urban fabric of the area, thus indicating a planned/inorganic urban fabric for the area.

The buildings are regular and symmetrical in size and shape and the building plots are uniform, regular and symmetrical. There are three types of residential buildings that form individual blocks for every building type. These three types of residential buildings are Type A, Type B and Type C (please refer to Table 1 below). It is also worth mentioning the officer's houses which were houses that were especially designed for the factory's management staff. Most of the officer's houses were two-apartment buildings,

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but some were semi-detached houses. Brick cladding was the main building material used to make almost all of these homes. However, the officer homes built after 1911 were built using a combination of plaster and brick. These building materials are apparent in Figure 2 below, on the facade of the buildings.

Figure 2: Former officers' houses of the ironworker's colony
Sources: Photo images adapted from Author (2023)

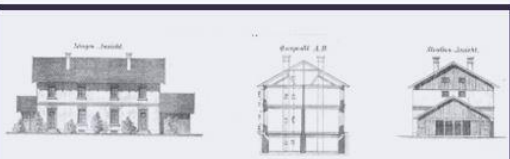
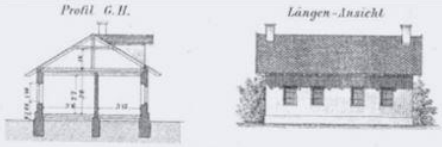
	Houses Types	Description	Color
1		**Type A:** The plot has a rectangular shape with a common green area and the façade of the building is basically long including eight bays.	
2		**Tybe B**: The plot divided into equal three parts, the building block is located in the middle part of it with two private green spaces. The block is a four detached housing units, the block has four separated houses with four front yards, two doors and 2 windows on the main elevation	
3		**Type C:** The plot has a rectangular shape, and the buildings of plot are located in the edge of the plot. The green space are adjacent to the building. the entrance of the single house unit is parallel to the street.	
4		**Type C-1:** The same layout of the Type C has been used in and represented as a pair of two detached buildings forming two units with a long façade facing the street with 8 windows, and an external staircase to reach the Atti	

Table 1: Building type classification
Sources: Photo images adapted from Author (2023); Plan sectional drawings adapted from [2]

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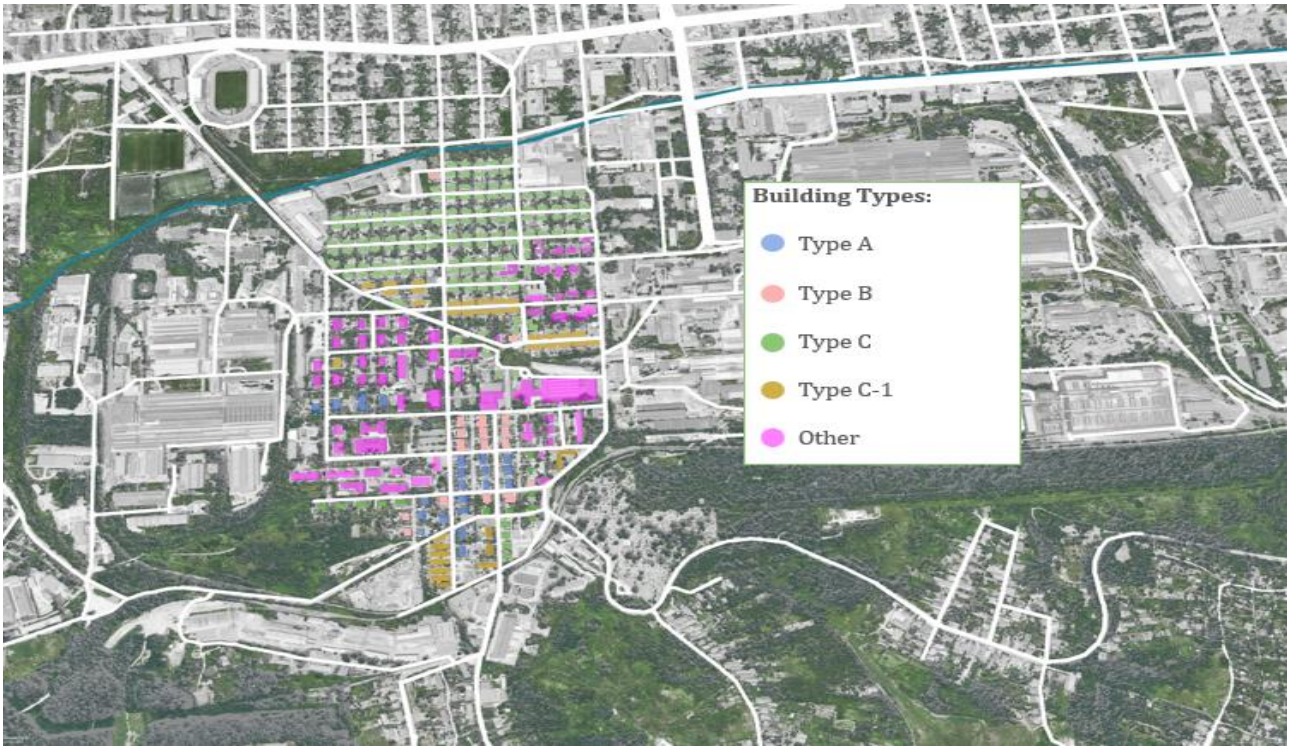

Figure 3: Modern map depicting different building types of the ironworker's colony
Source: Google maps orthophoto image adapted from [4]

	Building Condition Types	Description	Color
1	 	**Abandoned**: These buildings have been neglected and left in disrepair, often with broken windows and crumbling structures. They pose safety hazards and are no longer in use.	
2	 	**Bad**: Bad Buildings are in poor condition, with visible structural issues or maintenance problems. They may still be occupied but require significant improvements to meet basic safety and comfort standards.	
3	 	**Modetre**: Good buildings are well-maintained and structurally sound, providing a safe and comfortable living or working environment. They may have some minor wear and tear but are generally in decent condition.	
4		**Good**: Good buildings are not only well-maintained but also architecturally significant or exceptionally designed. They stand out as landmarks, contributing positively to the community and often serving as sources of pride and inspiration.	

Table 2: Building condition classification
Sources: Images 1,2 adapted from Author (2023); Images 3 adapted from [4]; Image 4 adapted [5]

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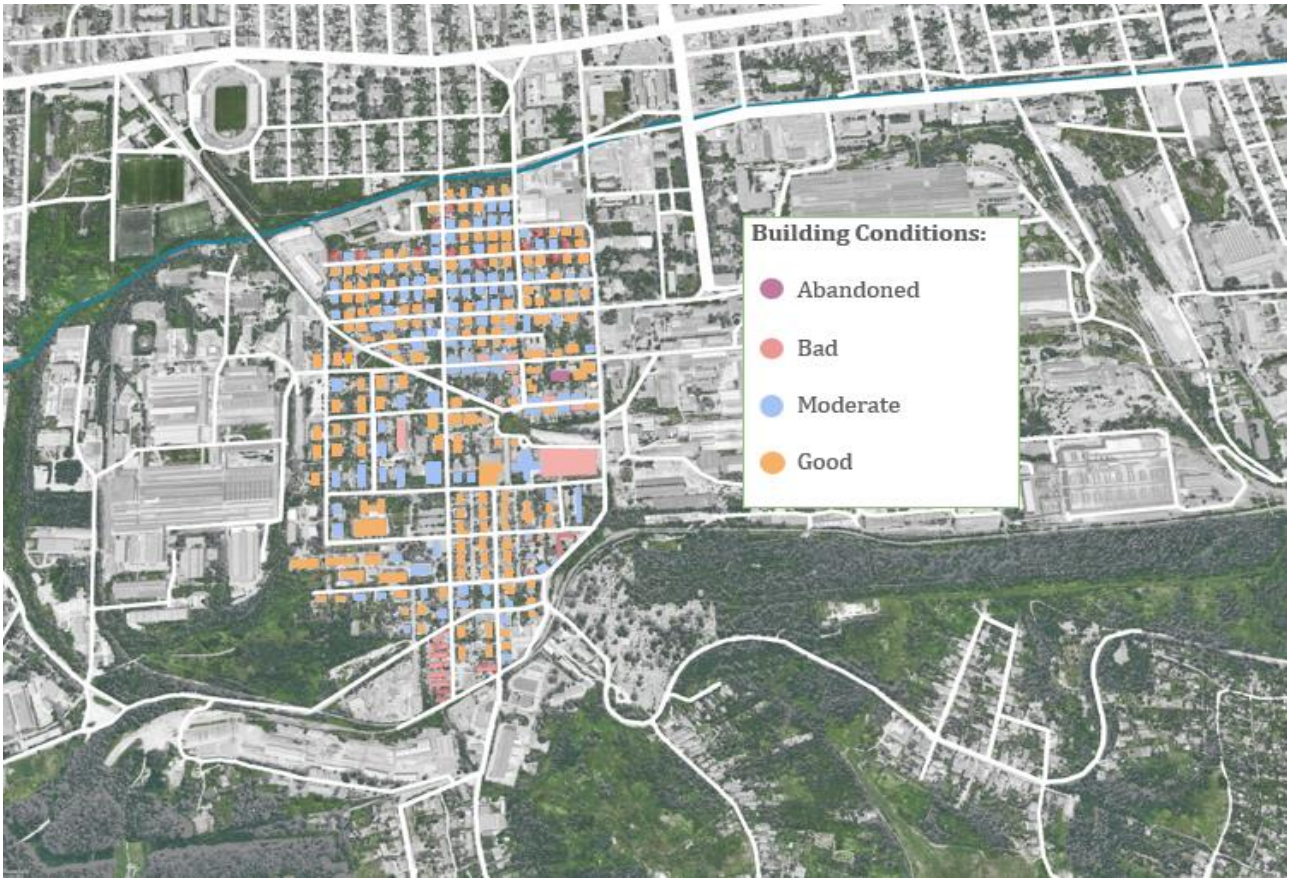

Figure 4: Depicting different building conditions on a modern map of the ironworker's colony
Source: Google maps orthophoto image adapted from [4]

Building Type A has a rectangular (almost square) shaped plot containing a green area, consisting of 2-storeys and a basement. The building is located in the middle of the plot. Three individual plots form a rectangular block.

Building Type B has a rectangular (almost square shaped) plot divided into 4 equal parts. Each building has 2-storeys, with a basement. The building is located in the middle of the plot. Three individual plots form a rectangular block. The block series consists of three blocks, with each block being separated by rectangular road networks.

Building Type C has a rectangular plot with the building being located on the edge of each plot, parallel to the road. These are single storey buildings with an attic. The greenspace within each plot is adjacent to the building. The building is separated in half into two plots, with one half of the building meant for one plot. This was the common worker's living quarters. The plots are rectangular and narrow with ten plots making a single block. Four blocks make a single rectangular block series, being separated by rectangular road networks.

The roads are constant in width and are well-planned, thus forming consistent roadway networks throughout the colony, connecting the colony to the surrounding settlements outside of Diósgyőr-Vasgyár.

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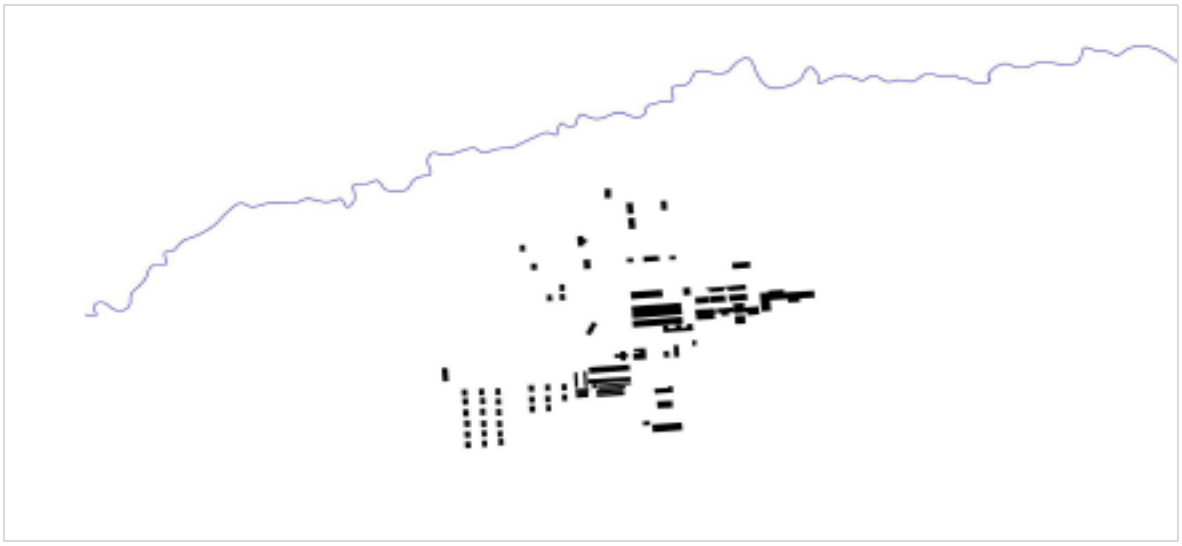

Figure 5: 19th century building morphology development of Diósgyőr-Vasgyár
Source: Adapted from Author (2023)

2.1. 19th Century (Early Industrial Age)

The first image shows a sparse distribution of buildings, characteristic of an early industrial urban fabric during the mid-to-late 19th century. The structures are relatively small and spread out, indicating a nascent industrial area. The layout outside of the ironworker's colony seems somewhat informal, with little evidence of a planned urban grid, which is typical of early industrial settlements where factories were often built first, and service buildings then being randomly built around the vicinity of the industrial area, to support the people living there and the industry. However, the irregularity here would be the formal urban planning of the residential homes for the iron workers, which was formally planned along with the steel factories. In terms of areas built on industrial activity, housing for factory workers is typically haphazardly constructed around the factories over time. This is not the case here.

Figure 6: Mid- 20th century building morphology development of Diósgyőr-Vasgyár
Source: Adapted from Author (2023)

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2.2. 20th Century (Industrial Expansion)

In the second image, there is a notable increase in the density of the built environment. The structures are larger and more numerous, reflecting the growth and consolidation of the industrial area. This could indicate a time of economic boom and increased production, likely accompanied by a population growth as workers migrated to the area for employment. The presence of larger buildings indicates the development of more advanced and larger scale industrial facilities. The layout becomes slightly more organized, suggesting some degree of urban planning or the imposition of an industrial grid, even outside of the immediate vicinity of the ironworker's colony.

Figure 7: 21st century building morphology development of Diósgyőr-Vasgyár
Source: Adapted from Author (2023)

2.3. 21st Century (Modern Development)

The third image shows further densification with much larger structures, reflecting continued industrial growth or diversification. The urban fabric is significantly more complex, with a mix of large and small buildings indicative of a mature urban industrial area. It suggests a more planned approach to urban design, with increased housing for workers and more substantial infrastructure to support the heavy industry. This also reflects a shift toward more modern industrial practices, with some previous factory buildings, residential buildings and public service buildings also being modified and adaptively reused; and the inclusion of commercial and service-oriented buildings as the community around the factories grow and develop.

2.4. Change Over Time:

- **Density:** There's a clear increase in building density from the 19th to the 21st century, reflecting urbanization and industrial growth.
- **Scale:** Building sizes have increased, indicating the growth of industrial operations and possibly the introduction of new technologies and facilities.

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- **Layout:** The transition from a more organic to a structured layout suggests the introduction of urban planning principles and the adaptation of the urban environment to support a larger, more stable population, especially outside of the ironworker's colony.
- **Functionality:** The evolving morphology suggests that the area transitioned from a primary focus on industry to a more mixed-use area, incorporating residential, commercial, and recreational spaces.

The development of the urban fabric in the Diósgyőr-Vasgyár area is a typical example of industrial evolution in a city, where economic activities shape the physical and social environment over time.

3. Preservation recommendations

The objective of providing recommendations on how to preserve the built heritage of the Diósgyőr ironworker's colony, pertaining to the residential buildings and the general public service buildings, is to ensure the optimal preservation of the buildings. Referring to the both the internal and external structure and appearance of these buildings, attempts are made to ensure that negligible change is made to the external appearance of the buildings, whilst simultaneously ensuring that the quality of life of the inhabitants of the residential buildings are improved and the quality of the services provided by the public service buildings are improved; whilst ensuring that the ultimate aim to preserve the building ensemble heritage is accomplished.

In order to achieve the objective, a logical approach was taken by first exploring and adhering to Hungarian legislation pertaining to building heritage preservation, the considering general principles for best practices and more practical considerations regarding the main internal and external building components, whilst finally making specific building material considerations.

3.1. Compliance with Specific Legislative Points:

- **Maintenance and Utilization (Act 1997/LXXVIII, Section 54)**: Ensure that the use of the building respects its historical purpose, or if a new use is required, it must be suitable and not compromise the historical integrity. [6]
- **Settlement's Overall Appearance (Act 1997/LXXVIII, Section 55)**: Any renovations must preserve the aesthetic dictated by the local government. [6]
- **Protection of Architectural Heritage (Act 1997/LXXVIII, Section 56)**: Maintenance and protection should align with the local, national, and international heritage values. [6]
- **Local Architectural Heritage (Act 1997/LXXVIII, Section 57)**: Actions should be approved by the municipal government and aim to preserve the unique local character. [6]
- **Maintenance of Protected Monuments (Act 2001/LXIV, Article 41)**: Keep the monuments in their integrity without altering their character, maintaining their architectural components in proper condition. [7]
- **Restoration and Suitable Use (Act 2001/LXIV, Article 43)**: The usage of the monument should give due respect to its historic value and character. First preference for usage should be mainly for public service and cultural affairs. [7]

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General Principles:

- **Following the Law**: Every involvement must adhere to Act LXIV of 2001 and Act LXXVIII of 1997, simultaneously making sure there is no change in historical prestige nor character.
- **Minimal Intervention**: Employ the least invasive methods to preserve authenticity and integrity.
- **Reversibility**: Ensure that interventions can be reversed without damaging the original fabric.
- **Compatibility**: Use materials and techniques compatible with the original ones.

Exterior Preservation:

Facade:

- Conduct regular inspections and maintenance to preserve structural integrity.
- Clean using gentle, non-invasive methods to avoid damage to historical materials.
- Repair using original or compatible materials, following traditional craftsmanship techniques.
- Paint with historically accurate colors and materials, as regulated by local authorities.

Roofs:

- Regularly inspect and repair roofing to prevent water ingress.
- Use traditional materials for repairs, such as tiles or slates that match the original in material, shape, and color.
- Ensure that modern interventions (like insulation) do not alter the external appearance.

Windows and Doors:

- Restore existing frames and panels using traditional techniques.
- Replace irreparable elements with replicas made of the same materials and designs.
- Use glazing techniques that provide modern efficiency while maintaining historical appearance.

Structural Integrity:

- Periodically assess the building's structural stability and perform necessary reinforcements, ideally hidden to preserve visual integrity.
- Use traditional construction methods and materials for any necessary structural repairs.

Interior Preservation:

Walls and Ceilings:

- Repair plasterwork with materials that match the original composition and finish.

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- Preserve historical decorative elements, repairing with like-for-like techniques and materials.

Floors:

- Refurbish original flooring using conservation methods, such as careful cleaning and refinishing.
- Where replacement is necessary, use materials that match the original in appearance and wear characteristics.

Utilities (Electrical, Plumbing, HVAC):

- Upgrade utilities to meet safety standards, routing them to minimize the impact on the historical fabric.
- Conceal modern installations where possible, or use designs that are sympathetic to the historic character.

Interior Features (Fireplaces, Moldings, Staircases):

- Preserve and restore using traditional craftsmanship.
- Ensure that any replacements or repairs are indistinguishable from the original work.

Lighting:

- Use lighting fixtures that are appropriate to the period, either original, restored, or sensitively designed reproductions.
- Implement modern lighting in a way that does not detract from the historic character.

Material-Specific Recommendations:

Stone and Brick:

- Repoint masonry with mortar that matches the original in composition, color, and texture.
- Clean masonry with non-destructive methods like soft brushes and low-pressure water.

Wood:

- Treat wooden components for pests and decay, using methods that do not harm the original material.
- Preserve or replicate historic carpentry using the same species and traditional joinery techniques.

Metal:

- Protect and treat historic metalwork for corrosion, employing conservation-grade products and techniques.
- Where elements must be replaced, use the same metal and fabrication methods.

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Professional Expertise:

Engage conservators, historians, and craftspeople skilled in traditional techniques for all restoration work to ensure authenticity and compliance with heritage protection standards.

Record Keeping and Documentation:

- Document all interventions in detail for future reference and research, complying with Article 43(5) of Act 2001/LXIV, which emphasizes the importance of historical documentation in restoration. [7]

Each intervention must be individually assessed and approved by the appropriate heritage authorities to ensure compliance with Hungarian and international heritage conservation standards.

4. Adaptive Reuse

The purpose of this section is to provide recommendations and strategies for the adaptive reuse of the inside of the buildings of the ironworker's colony. Since the buildings of this colony are considered building heritage, they are protected by the local government and significant changes cannot be made to exterior of the buildings, which would alter the appearance of the buildings.

The recommendations will focus mainly on the residential buildings, in an attempt to improve the quality of life for people living in these residential homes. However, general recommendations will be provided for the adaptive reuse of public services buildings. Furthermore, general recommendations will also be provided for adapting some residential buildings for public or common use.

4.1. Constraining factors

- People come and go there, residential building occupants tend to vary by season, as inhabitants travel in and out of the colony.
- Large variations in family size per residential home.
- Buildings inside have already been adapted to meet the unique needs of inhabitants for different homes, thus making it more difficult to make general recommendations.
- Local municipality owns some homes, other residential homes are privately owned.
- Meeting general needs vs specific needs of the residential building inhabitants.
- There are three main types of homes according to the original plans of the ironworker's colony. However, this has greatly changed over time due to modifications being made to the internal and external structure of the buildings to meet specific needs, for example building extensions.

4.2. General recommendations based on similar projects:

- **Building Accessibility**: All buildings should be fully accessible to disabled people. Increasing the width of doorways, and implementing floor ramps could help achieve this.

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- **Flexible Interior Layouts**: Design interiors with flexible layouts to accommodate various lifestyle needs. Some common examples include movable partitions, open floor plans and spaces that are adaptable for varying family sizes.
- **Environmentally Sustainable Practices**: Sustainable construction techniques and design should be utilized. This can include energy-saving appliances, harvesting of rainwater and ecologically viable materials to minimise the buildings' environmental footprint.
- **Artificial vs Natural Lighting solutions**: Utilise interior finishes which reflect light and older windows that are historic should be replaced in order to enhance natural light.
- **Perception of Heritage**: Create signs and other marketing materials for raising awareness toward residents about the Diósgyőr colony's historical significance. Develop interpretive signage or materials that inform residents about the history and significance of the Diósgyőr ironworker's colony. Such efforts will contribute to increasing the appreciation of residents toward their special living space.
- **Community Engagement**: Allow for the participation of residents and the larger surrounding community in the decision-making process and involvement in design initiatives. The input of these members of the community could make for better results and an enhanced sense of identity and ownership.

4.3. Suggestions for cultivating an air of privacy and safety within households:

- **Dividing of Open Space**: Utilise room partition dividers, opaque curtains and physical objects for partitioning space, such as cupboards, to divide the room into separate areas for a greater sense of privacy for all members of a family.
- **Enhancing Niche Security and Lock Systems:** Install reliable locks on doors as well as windows. Try to add features such as peep holes to the main entrance door so householders can see the potential visitor without having to open the door.
- **Enhanced Storage Facilities:** As an alternative storage solution, make use of vertical space. Try to make use of solutions like stackable bins and shelves to help organise belongings and reduce clutter. This can create an enhanced feeling of privacy and peace.
- **Sufficient Artificial Lighting**: Make sure that the room has enough light. Consider creating a welcoming and safe feeling for the room by utilising main overhead lights and minor lights designated for specific tasks, such as wash basin lighting.
- **Setting up a 'Safe Haven' space:** Demarcate a little area of the room where a member of the family may retreat to, to be alone with a sense of privacy and security. It can even be a corner of the entire room with small furniture like a desk with chair, that enables the individual to be completely of the sight relative to other family members.
- **Soundproofing**: If noise is an issue, consider adding soundproofing elements like heavy curtains, rugs, or foam panels to reduce external noise and create a more peaceful environment.
- **Bright and Cheerful Decor**: Use colours and decorations to create a cheerful and positive atmosphere. Bright coloured wall paint, plants, or colourful cushions can make a big difference in the overall feel of the space.
- **Multi-Purpose Furniture**: Invest in furniture that can serve multiple purposes, such as a sofa bed or a table that can fold away when not in use. This helps in maximizing the available space.

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A simple questionnaire was created for inhabitants of the residential homes in the ironworker's colony to answer. Based on the responses, specific recommendations were made to target major issues such as electrical safety, thermal insulation, waterlogging, which would drastically improve the lives of the inhabitants if these issues were to be alleviated.

4.4. Specific recommendation from the results of a questionnaire/survey of the area:

Layout and Usage of Apartments and Garden

- **Garden Enhancement**: Encourage the older generation to continue using gardens for vegetable growing by providing resources for better gardening techniques. Introduce community gardening workshops to increase knowledge and yield.
- **Fruit Tree Maintenance**: Offer workshops on fruit tree care to help residents maintain and get the most out of their fruit trees.
- **Interior Space Utilization**: Consider offering interior design workshops/advice/consultations to help residents make the most of their living spaces, focusing on multi-functional furniture and storage solutions.

Changes already made to homes

- **Bathroom Conversion**: Ensure that the conversions meet safety standards and are as space-efficient as possible.
- **Insulation and Loft Installation**: Encourage the use of eco-friendly and cost-effective insulation materials. Provide information on government grants or subsidies for such renovations.
- **Adjoining Flats Conversion**: Offer legal and architectural advice for tenants considering this type of restructuring to ensure it's done safely and legally.
- **Window Walling**: Provide creative solutions for natural lighting and ventilation, such as skylights or light tubes, especially in areas where windows have been walled.

Renovation/Restructuring Plans

- **Thermal Insulation**: Collaborate with local authorities to provide group discounts or subsidies for bulk purchasing of insulation materials.

Implementing affordable and effective thermal insulation solutions in older buildings, especially in poorer communities, can significantly enhance living conditions while being cost-effective. Practical solutions which may be implemented are:

- **Weather Stripping and Caulking:** One of the simplest and most cost-effective methods is to seal gaps around doors and windows using weather stripping or caulking. This prevents drafts and heat loss.
- **Broad Opaque Drapes and Thick Curtains:** Using thicker curtains can help to absorb heat in the winter and other cold periods, and expel heat in the summer. Householders can even make this from thick fabrics lying around.

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- **Window Insulation Film:** Applying clear plastic film to the inside of windows can reduce heat loss. The installation of this product is easy and it is highly affordable.
- **Stern Chipboard Insulation Planks & Boards:** Stern boards for insulation may be fitted directly against ceilings or walls. This technique is most used on walls in direct exposure to the outside of the building and attics as well.
- **Foil Reflecting Material:** Strategically putting these special foils on the surface of external walls, at the back of radiators, in order to retain heat energy in the room as opposed to walls absorbing heat.
- **Do-It-Yourself Materials for Insulation:** Make use of materials that are cheap and easily available such as foam boards and bubble wrapping, which may be used in the insulation of smaller-sized areas like in a basement or wound around air conditioning devices.
- **Community Recycling Initiatives:** Create community projects to acquire, re-fashion and reuse materials for insulation. This can include polystyrene for insulation in walls as well as fabric and textile waste which can be used for draft stoppers.
- **Air Draft Stoppers:** Place the special draft stopper made of fabric in the space between the bottom of the door and the floor to stop hot air from leaving or cold air from coming into the house.
- **Education and Workshops:** Hold community workshops to educate residents about simple DIY insulation techniques and the benefits of energy efficiency.
- **Grants and Subsidies:** Investigate local government grants, subsidies, or non-profit programs that might provide financial assistance for larger insulation projects.

Windows and Doors Replacement

- Organise mass group buying of windows/doors initiatives and negotiate with sellers for energy-saving doors and windows.

Usage of the Attic

- **Optimal and Efficient Storage Methods**: Give suggestions for optimally setting up the attic. Consider changing a part of the attic into a new room which could serve more useful functions.

Safety Concerns

- **Flooding, Seepage and Waterlogging Problems**: Acquire possible funding from the public or community and attempt to acquire municipal/regional assistance from the government. Additionally, provide trainings and workshops for mould removal and waterlogging issues,

Recommendations for Waterlogging and Drainage Issues

Category	**Strategy**	**Description**
Community Drainage Improvement	Community Engagement	Mobilize community participation in drainage projects to foster ownership and responsibility.
	Collaboration with Authorities	Work with local authorities to assess and improve the existing drainage system.

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Rainwater Harvesting and Diversion	Gutter Installation	Install gutters on rooftops to collect and divert rainwater away from building foundations.
	Rain Barrels	Use rain barrels to collect rainwater for community use, reducing surface runoff.
Green Infrastructure	Vegetative Swales	Create vegetative swales or depressions planted with water-absorbing plants for natural drainage.
Interior Waterlogging and Mould Issues	Improved Ventilation	Install exhaust fans for proper ventilation and promote cross ventilation through strategic window placement.
	Waterproofing and Sealing	Seal wall cracks with waterproof sealants and apply waterproof coatings to exterior walls.
	Elevate Vulnerable Areas	Raise electrical outlets, wiring, and appliances above potential flood lines.
	Emergency Preparedness	Develop and communicate a community emergency plan with evacuation routes and emergency contacts.
	Educational Workshops	Conduct mould prevention workshops, teaching residents to identify and address mould issues.
	Affordable Mold Removal Solutions	Provide DIY mould removal kits for residents.
	Financial Assistance	Explore grants and subsidies for home improvements related to safety and water damage.
	Regular Maintenance Checks	Establish teams for regular maintenance checks to identify and address potential issues early.
Preventative Measures for Waterlogging	Erecting Flood Barriers	Install flood barriers in flood-prone areas to protect buildings.
	Widening/Deepening the Szinva River	Widen or deepen the flow channel of the Szinva river in vulnerable areas.
	Waterproofing Foundations	Apply artificial waterproofing materials to building foundations.
	Soil Barriers	Use impermeable clay soil to prevent groundwater seepage into buildings with waterlogging problems.

Table 3: Potential solutions for drainage/ waterlogging issues for the colony inhabitants

Electricity Safety Recommendations

Strategy	**Description**
Electrical Safety Inspections	Conduct thorough inspections of existing electrical systems by qualified electricians to identify hazardous conditions or immediate needs.

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Community-Based Electrician Training	Organize training programs for local residents to become certified electricians, ensuring sustainable skills within the community and reducing costs.
LED Lighting	Encourage the use of energy-efficient and long-lasting LED bulbs to reduce electricity costs and replacement frequency.
Solar Power Solutions	Implement small-scale solar power systems in communities with adequate sunlight, reducing dependence on grid electricity.
Rewiring with Safe Materials	Use quality, safe materials for any necessary rewiring, prioritizing safety and longevity despite higher initial costs.
Simple Circuit Designs	Implement straightforward electrical circuit designs for ease of maintenance and repair, facilitating local training in basic electrical upkeep.
Safety Education Workshops	Conduct regular workshops on electrical safety, teaching residents to safely use electricity, identify hazards, and perform basic maintenance.
Energy Efficient Appliances	Promote the use of energy-efficient appliances, especially in older buildings with limited electrical capacity.
Government and NGO Partnerships	Seek partnerships with government agencies or NGOs for financial, technical, or educational support in improving electrical safety in low-income housing.
Regular Maintenance Checks	Establish a regular schedule for maintenance checks to ensure ongoing electrical safety, performed by trained community members or local electricians.
Battery-Powered Emergency Lighting	Encourage the use of battery-powered lights for emergencies, particularly in areas prone to power outages.

Table 4: Suggestions for enhancing the quality of electricity supply for colony inhabitants

Additional Information

Preparation for Different Seasons: Set up special courses or workshops on how to prepare for the different seasons emphasizing how to prepare households in a cost-saving way for efficient insulation and heating for varying types of weather.

Monthly Overhead and Rent Expenses: Provide classes and courses for better management of personal finances to assist tenants with more efficiently managing their monthly expenses.

Discussion

This research about urban heritage delves into the contribution made to the preservation of urban heritage through the main findings of the study. This was achieved through the historical analysis, a thorough urban assessment and collaboration with the NGO. The effectual balance between modern living adaptation and the preservation of historical integrity are considered. Additionally, useful discernments are provided for similar issues that are faced by urban environments in a post-industrial setting. The research undertaken herein managed to effectively integrate theoretical frameworks with practical outcomes and was ultimately effective for emphasizing the importance of community participation for heritage preservation.

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Conclusion

This study synthesizes the significant findings from the study on the Diósgyőr ironworker's colony in Miskolc, Hungary. It reaffirms the importance of preserving the unique architectural heritage of the area while adapting it to contemporary living standards. The study offers a model for urban revitalization, especially in post-industrial settings, by blending historical conservation with modern needs. The involvement of the local community and collaboration with an NGO highlights the necessity of participatory approaches in heritage projects.

This research proves the successful use of a multi-method model for the study of high-heritage value urban domains. It furthermore proves that it is possible to simultaneously cater for the needs of the area's inhabitants whilst creating solutions for the effective conservation and preservation of the urban area.

The study conducted here provides a useful roadmap for future research regarding the interplay between 21st century urban expansion and the preservation of urban heritage. Many new avenues for research are created for future development about sustainable methods for the conservation of historical localities in the vicinity of developing and fast-changing urban areas. This research thus adds to the growing global discourse by contributing practical directives and useful insights toward related undertakings.

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Conflicts of Interest

The authors declare no conflict of interest.

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