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Assessment of Rehabilitation Possibilities in Case of Budapest Jewish Quarter Building Stock

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***Abstract*—**The dense urban fabric of the Budapest 7th district is known as the former Jewish Quarter. The majority of the historical building stock contains multi-story tenement houses with courtyards, built around the end of the 19th century. Various rehabilitation and urban planning attempt occurred until today, mostly left unfinished. Present paper collects the past rehabilitation plans, actions and their effect which took place in the former Jewish District of Budapest. The authors aim to assess the boundaries of a complex building stock rehabilitation, by taking into account the monument protection guidelines. As a main focus of the research, structural as well as energetic rehabilitation possibilities are analyzed in case of each building by using Geographic Information System (GIS) methods.

***Keywords*—**Geographic information system, Hungary, Jewish quarter, monument, protection, rehabilitation.

I. Introduction

THERE had been multiple "Jewish Quarters" in Budapest during the previous centuries. On the Buda side of the River Danube, Jewish residents occupied a part of the Buda Castle Hill, and they also lived a little northern, in Óbuda. On the Pest side, the so-called Old Pest Jewish Quarter is situated in the neighborhood of the present District 7; the new Jewish Quarter of Budapest later became Újlipótváros, todays' District 13 [1]. Present study focuses on the Old Pest Jewish Quarter (Fig. 1). This part of Budapest, known as Belső-Erzsébetváros (or Inner-Elizabethtown, named after the beloved Queen Elizabeth of Austro-Hungarian Empire) was still completely unbuilt in the 17th century. The development of the district began spontaneously in the 18th century, as the population of Pest started to outgrow the city walls of the middle age. The area in that time mainly consisted of manors and fields. The first craftsmen and merchants coming from the city started to build here, bringing the urban characteristics to the agricultural neighborhood. The emerging suburbs offered settling opportunities for the laborers working on the citizens' gardens [2].

The development started in the 18th century lasted nearly for a hundred years. The narrow, rectilinear streets, the organic network, the frequent T-shaped intersections, as well as the diverse width of the streets can be originated from the agricultural past of the area. This kind of organic fabric can rarely be found in todays' regulated Budapest [2].



Fig. 1 The Old Jewish Quarter of Pest, in today's District 7 of Budapest [3]

The Great Flood of the River Danube in March 1838 destroyed significant ratio of the buildings of the district, which this time had been the densest and most populated area of Pest. As replacement for the demolished one-story buildings, urbanized, two- or three-story, L or U shaped houses were built in an unbroken row along the streets. The builders were prosperous citizens with often newly established citizenship, as well as immigrant craftsmen and masters from e.g. Austria, Moravia, or Jewish traders [2].

Until Joseph II, Emperor and King of Austro-Hungarian Empire, legislated the Patent of Toleration in 1783, Jews were prohibited to enter the walled Pest, and were also not allowed to settle until 1786. A law of 1840 at last permitted them to own real estate, until then, their praying rooms and apartments were also in rented houses. Naturally, the establishment started around the Jewish Market outside the city wall, alongside the main street of the area: Király Street (King Street, King of England Street at the time, Fig. 2) [2].

At the same time, the first passage houses (Fig. 3) and pedestrian crossings have developed through the deep blocks, later grown into a full system. The passage houses and crossings expanded the commercial life, at the same time

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supported the faster, smoother, hidden way to reach the synagogues. The daily practice of religion was carried out in praying rooms of apartment buildings [2].



Fig. 2 Characteristic urban fabric of the turn of the 19th and 20th century in the district [4]



Fig. 3 Passage houses- chain layout connecting the streets and opening up the deep block for commercial life [2]

The darkest period of the city was undoubtedly – as of all Europa's- the time of the Holocaust. The traditional Jewish Quarter of Pest became a ghetto in December of 1944.

During the post-war renovations, the buildings most severely damaged by the bombing were demolished. Few of the deported Jews came back, a significant part of the surviving population emigrated. The nationalization ruined the just restarting commercial life [2].

At the beginning of the eighties, a short development started: Rehabilitation, the renovation of historical district houses begun here, first in the capital city. In 1988, however the program was halted after renewal of only three blocks [2].

II. Characteristics of the Quarter

The majority of the buildings in the Old Jewish Quarter of Pest could be typical in other parts of the city, however since the historical development of the district was unique, the early, 19th citizen houses of Pest can be found coherently and in exceptionally large number. On the other hand, from the middle of the 19th century, the Jewish commercial area flourished, which resulted some rare house types came into existence, for example: passage houses, tenement houses built together with synagogues or small factories.

The vaguely regulated urban development resulted diverse blocks and irregular lots (Figs. 3, 4). The size and shape of the different lots as well as the changing architecture historical periods offers the rare sight of diverse tenement houses adjacent to each other [5].



Fig. 4 Unique building layouts in the Old Jewish Quarter of Pest [2]



Fig. 5 Király Street, the main street of Jewish Quarter of Pest, archive photo [6]

The diversity of the houses is also increased by the combination of more and less ornate buildings (Fig. 5), as well as the mixture of apartments with and without the modern conveniences, resulting diverse social groups living side-by-side.

In case of every architectural era, the enclosed geometry of the tenement houses with inner courtyard can be marked as characteristic. However, due to the higher ratio of early buildings, more L, U, or enclosed structure remained with spacious courtyard (Figs. 6, 7) – which is unique compared to the adjacent districts.

The application of decorative Jewish symbols can be observed on the Art Nouveau (Secession style in Hungary) buildings of the turn of the 19th and 20th century. The Hungarian and Oriental motifs alongside the Jewish symbols are considered rare even in the Jewish Quarters [5].

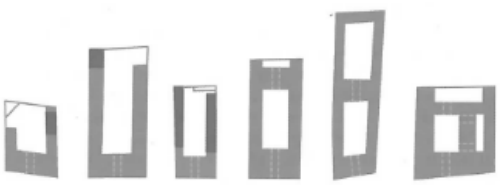


Fig. 6 Typical building layout with spacious courtyard from the 19th century [2]

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Fig. 7 Larger inner courtyard in the Jewish Quarter of Pest (Photo is courtesy of Kővári Csenge, Mészáros Mónika and Hegedüs Marcell – Ybl Miklós Faculty of Architecture)

III. Present State of the Quarter

Even after three centuries of constant development and multiple transformations, despite the disappearance of many values, we inherited a uniquely precious historical district. A Quarter, after many historical trials, still has Jewish community left to form the culture of the area. The unique architectural and cultural unity however has already been disrupted by many effects changing transforming even the urban fabric [2].

Today, the buildings are endangered in many ways. In recent years, the area has been going through an intensive functional transformation: It is now referred as the "party district" of Budapest, with its internationally famous ruin pubs. The historical style buildings are often demolished under the pretense of modernization, which in milder cases only results the loss of the character of the building. In more severe cases, the whole building is demolished. On the other hand, the structure and the physical condition of the buildings are often deteriorated, requiring renovation. Their poor energetic states decrease their value. Renovations are, however, in several ways difficult. Due to the monument protection guidelines, the insulation is questionable, and the renewable energy utilization, as well as other engineering solutions have limited possibilities.

Previous research shows that in Inner-Elizabethtown the 78.3% of flats were equipped with every modern convenience [7]. However there is a huge difference in quality between the private and local government owned apartments. The 40% of the government owned residential building stock have no modern conveniences. Most of these buildings are degraded, their condition is not sufficient for the modern hygiene and health standards [7].

Out of the 486 slot and 623 building of the area, the renovated ratio is only 19%, while the remaining 81% requires renovation. Urgent repair would be needed in case of 58.000 m^2 of flats and 24.000 m^2 of other estate [7].

From historical point of view, other than the damage caused by the demolition of monuments, significant ratio of the passage houses have been destroyed, the pedestrian system they offered is nearly extinct or missing crucial elements [2].

IV. Previous Rehabilitations in Old Pest Jewish Quarter

A. The "Madách Boulevard"

The project of Madách Sugárút (Madách Boulevard) has been the most grandiose intervention in the mainly organic structure. The idea of the first so called Erzsébet (referring to Queen Elisabeth again) then later Madách Boulevard was first introduced in the beginning of the 20th century. The concept was to open a main road to rival the nearby Andrássy Boulevard, which is ever since its opening has been the most important avenue of the area. Several plans were created, from which in 1930's, the complex of 11 interlocking buildings were built with a great gate motif to open up the densely built in inner parts. The plan however halted here, and only the beginning of the boulevard was built (Figs. 8, 9) [8].



Fig. 8 Opening of Madách Boulevard the older buildings can still be seen through the gate motif [9]

For the project, the largest and most important tenement house of the Jewish Quarter was demolished with many others.

Since the 1940's, various plans had been created and many suggestions were made to finish the project. Some critics pointed out that the plan is disregarding the current structure of the city [8] – the plan would have demolished significant early buildings and monuments, and would have brought a different scale of road and building stock to the area.

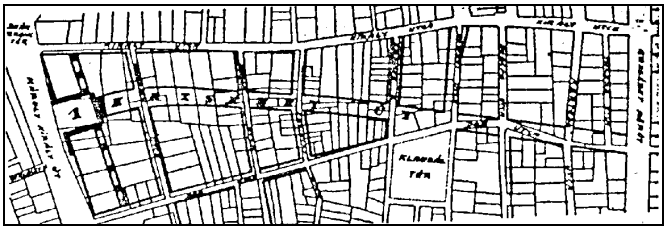


Fig. 9 Plan of Madách Boulevard – only the opening on the left part was finished [7]

The Madách Promenade remained on topic ever since. The latest plans suggested the evolution of the boulevard to a promenade, then a passage [7], which is a more delicate intervention than its predecessors, reducing the Boulevard to a passage. The latest constructions have been created in this regard (Fig. 10). The investment undoubtedly increased the

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tourism and average condition of the surrounding buildings, however still got criticism for disregarding historical aspects.



Fig.10 Contemporary buildings in the passage-section of the boulevard [10]

B. Block Nr. 15 Rehabilitation

Since the World War II, significant ratio of the buildings was in deteriorated state in the inner district. At the same time, 20% of the population of Budapest was living in this building stock [11].

The current rehabilitation practice of the time had two main solutions. In case of reconstruction, the whole block was demolished, only keeping the most significant monuments. The demolitions enabled to create place for the entirely new system of public utilities and contemporary buildings [11].

The other solution is rehabilitation, or block rehabilitation. In this case, the enclosed inner parts are opened up. By demolishing the backward wings, airy courtyards, passages and parks can be opened. The attics are utilized; the cars can also be stored inside the block. Some buildings are completely renovated. The buildings beyond repair are demolished for new buildings to be built. Above this, the ongoing rehabilitation of the surrounding results the up-valuation of the apartments [12].

The building and apartment operational costs are radically reduced via renovated façades and roof, as well as engineering upgrade (solar energy, rainwater utilization). By optionally covering the ground floor and creating passages, the income of the house can be increased. The rehabilitation thus can result the building to become self-sustaining, economically independent.

Mostly, the rehabilitation uses public participation, private funds, as well as involvement of local residents. For the inhabitants of the demolished buildings, new apartments should be found. The private funds are appearing in case of newly created offices, shops, flats and garages. By this, the urban functions broaden, which is further improved by the rehabilitation [12].

As a result, the environmental impact is significantly lowered. By creating parks and green façades, the green biologically active surface, as well as the quality of the microclimate increases. The area's architectural-historical-sociological continuity is preserved [12].

The Erzsébetváros rehabilitation was started with the Sample Block Nr. 15 (Fig. 11).

The Sample Block Nr 15. contained a synagogue and other ecclesiastic buildings. Out of the existing 303 flats, 150 were demolished, to build 170 in entirely new buildings. The average 49 m^2 floor space of the existing flats were enlarged averagely to 65 m^2. The inside of the blocks were rebuilt as parks and playgrounds. Between 1982 and 1985, the construction was finished. Above residential development, the public buildings (a university, a museum and offices) were renovated or given new buildings. Majority of the new residents were the same as before, or moved here from the adjacent blocks [11].

As a result, a recreational zone was created in one of the most populated area of the inner districts. The flats gained more value, the residents moved in flats with every modern convenience [11].

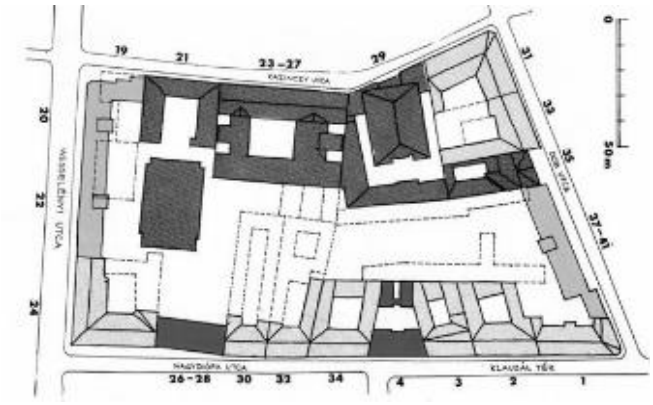


Fig. 11 Sample Block Nr. 15 after rehabilitation. The demolished wings are marked with dashed line [13]

V. The Boundaries of Rehabilitation in Case of Densely Built in Heritage Districts

A. Monument Protection Boundaries

The case study area, the Old Jewish District of Pest is unique in many ways. Its organic fabric and built in structure is originated from the 18-19th century. From historical point of view, above the many monuments situated here, it is the area of the Jewish District, later ghetto of the World War II.

As acknowledgement of it significance, it became part of the UNESCO World Heritage Area, which consist of the Buda Castle Hill, the Danube banks, the Andrássy Avenue (Fig. 12).

Although the UNESCO status does not offer direct monument protection, it successfully adverted the case of the Jewish Quarter either nationally and internationally.

In Hungary, the monument protection of the area consists of many levels: Individual monument protection or historical building protection, capital city protection, conservation area, and monument neighborhood. The protection levels can be international, national, local levels. The local level protection is under the judgement of the local government [14].

The expression monument - or as called otherwise: listed, protected historical building - consists of all buildings, gardens, cemetery, burial place, area (or their remnants) as well as their system, which are significant in terms of the country's past, sense of identity, outstanding historical, artistic, scientific remembrance with all their accessories and

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furnishing. A listed or protected historical building is registered and declared protected by law [14].



Fig. 12 Buildings under individual protection is shown with darker shade, the UNESCO buffer one area is marked by dotted line. It is also a conservation area. Based on [7]

The conservation area may cover whole districts or settlements. According to the law, the parts of the settlement placed under such a protection have characteristic structure, fabric, connection to landscape, the buildings and spaces in-between as a system have historical importance and thus therefore worth historic protection.

The zone surrounding the protected building is called monument neighborhood area. It consists of the adjacent sites and buildings.

The limitations concerning the protected buildings are the following: During restoration and utilization, the historically coherent properties and buildings should be managed by unifying solutions. It is prescribed to reinstall the previously removed, but identified parts and accessories. Every change may be performed in such a manner and extent, which does not affect or endanger the set of values (mass, space relations, ratios, symbolic content, façade design, etc.). However maintaining a monument does not mean the obligation to present it.

The protected buildings should be preserved physically. The activities concerning construction should always be dependent on special researches. The historical values concerning building structure and material should be explored and documented.

In case of repair or modernization of a part, the preservation of the original or existing part should be primary aim. If the extent of destruction causes inability to use the original parts, it is enabled to use replacement of identical or same material [14].

Additions, new buildings or wings should not endanger the preservation, predomination or authenticity of the monument. A protected building cannot be demolished under any circumstances (in case of Jewish Quarter, more protected buildings were demolished recently). When dealing with a monument protection project the architectural licensing plan should contain extensive, special surveys – also the list of construction activities subject to authorization concerning the monument is more extensive [14].

B. Structural and Geometry Boundaries

In case of energetics and energy efficiency renovation, the prescribed requirements for boundary layers can be the same as in case of new construction. It should be, however, taken into account that not every old structure can be renovated to comply these constraints. There are certain technical solutions to comply the contemporary energetic requirements in case of historical buildings; however, their price is unrealistic in most cases. Thus, the ornate street façades of the historical buildings cannot be insulated with the traditional materials. In case of representative protected buildings, the exchange of older, wooden fenestration to plastic is also questionable. In this case, the window renovation is a possible solution, or the piece production, which significantly increases the costs.

Another example is the insulation of the floors, to reduce the heat losses towards the soil. This is an important point particularly in case of one-story or low-level buildings. The insulation of the attics can also be problematic, if the insulation material thickness leads to excessive inner height decrease.

In case of existing buildings, there is no way to improve (reduce) the cooling surface – heated volume ratio, or the ratio of glazing.

As for the engineering, the boundaries are also narrower in case of densely built in fabric. In case of a given size of ventilation shafts, the heat recovery recuperator system installation can cause problems because of the tight places, and built-in furniture. In case of central area, the fresh air should be sucked in from the roof, - as it is cleaner than on lower levels-, which cannot be solved without air tubes. In public places, such as courtyards, this solution should be ruled out for aesthetic reasons.

There are also limitations on heater side. In case of an apartment building with existing parapet gas convectors, the apartment centered modern gas-heater cannot be installed because of the lack of chimneys.

Although none of the above listed obstacles are unsolvable, the possible solutions are often too costly to be adapted [15].

C. Renewable Energy Boundaries

The difficulties of using soil collector or any water-based heat pump in the dense urban fabric, particularly in existing buildings, are clear. The biomass heat production in such an area in much case can be excluded, because of the transportation and storage difficulties, as well as the amount of dust pollution. The obstacles of wind and hydropower generation are also evident [16].

The sole generally applicable solution above solar utilization is the air-air heat pump, especially if it is possible for it to use the inside air with heat recovery system, instead of

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the outside air. Essentially, in case of existing buildings, in most cases, the usable renewable energy is solar energy, since almost all buildings have suitable roof surface to install solar collectors or photovoltaic panels. Of course, there are also exceptions, for example in case of adjacent buildings with different height: If the higher building constantly casts shadow on the lower building's roof, the solar energy generation will not be efficient [15].

Based on the aforementioned facts, it is concluded that there are existing buildings, where no renewable energy can be utilized cost-efficiently, but the majority of the buildings can use some extent of solar energy. The efficiency of solar energy generation in case of old buildings is often lower than in case of new buildings: the geometry and the usable energy-utilizing surface is not designed to supply the energy demand of the building, but rather the already existing surface can be used in some extent. The generally usable roof surfaces are often interrupted by outdoor elements, such as elevator engine, roof fans, chimneys, roof ventilators, wires, which considerably limit the size and efficiency of solar energy utilization. The problem is particularly significant in case of densely built in fabric, especially in case of higher buildings, where the net energy demand is also higher [17].

The façades can also be equipped for energy utilization; however, installing solar panels on the these surfaces significantly affects the appearance of the building, or the cityscape, which is not an option in case of conservation areas or protected buildings - also this solution tends to be less cost efficient than using roof surfaces.

VI. Geographical Information System Methodology in Case of District Survey

The case study area was surveyed from many aspects. The first step was historical data mining. The related historical books, cadasters, and the original architectural plans from National Archives were analyzed in case of each slot: The history of the area and each building were examined with special emphasis on constructions, reconstructions, additions and demolitions. The Jewish related functions, marks and other data were also added. As a second step, field research was organized [18].

During field research, every building was photo documented. The main geometrical data (footprint, height, courtyard area, glazing ratio, relevant building materials and structures) were recorded.

In case of inaccessible area, for example exact roof geometry, enclosed spaces, online satellite map applications were used for minor corrections. By organizing the collected data, an extensive database was created. The database is directly linked to maps for illustrate the results.

VII. Conclusion

Literature discusses the historical inner city areas' cultural, architectural historical assessment, however their present state and future is rarely mentioned.

The district development plans mostly declare an overall renovation plan, while not mentioning its method. The vast majority of the downtown buildings are in run down condition, and considerable number of them is under national monument protection. Demolition of these buildings is often justified by the aging of construction and the reduction of energetic values of the building. Currently, it is unavoidable to systematically survey this building stock, considering not only the increasingly strict energetic values and increasing price of energy, but the question of sustainability.

The previously mentioned apartment buildings can be modernized structurally and energetically within certain limits. The limits contain many aspects, for example the densely built in fabric resulting many architectural and engineering problems.

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