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Adapting the Historic Urban Landscape Approach to Study Slums in a Historical City: The Mae Kha Canal Informal Settlements, Chiang Mai

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Abstract: Beyond conserving urban heritage, the concept of historic urban landscapes (HULs) aims to tackle poverty and inequality, as well as to improve the quality of human settlements, through a people-centered approach in the context of rapid urbanization. This paper demonstrates the adaption of HUL tools and methodologies to investigate a slum in a historical city—the informal settlements along the Mae Kha Canal in Chiang Mai. An on-site field survey of the characteristics of the settlement's composition and interviews with stakeholders, local authorities, and inhabitants were conducted. The analysis revealed that there is a gap between the desired strategy of the Mae Kha Canal agenda and the actual conditions of the location. The aforementioned contrast is discussed to suggest alternate options for upgrading the informal community while preserving its ancient walls, in line with HUL principles. The conclusion highlights the benefits of introducing the HUL approach in a slum setting and provides recommendations for deteriorated neighborhoods elsewhere that are either surrounded by or adjacent to historical features needing resilience.

Keywords: historic urban landscape (HUL); slum upgrading; historical city; settlement composition; sustainable development planning; Mae Kha Canal informal settlements; Chiang Mai

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1. Introduction

To achieve an equitable balance between conservation and development in contemporary times, UNESCO has called for the implementation of the historic urban landscape (HUL) approach, which aims to effectively manage heritage resources in dynamic contexts, leading to a multitude of benefits, including enhanced livability, resilience, safety, inclusivity, people-centricity, and sustainability [1]. The so-called HUL approach draws its origins from concerns over the destruction of natural and cultural heritage, taking responsibility for ill-planned or non-planned developments, particularly in cities that have to respond to rapid growth in the population and the consequent need for housing, employment, and service infrastructure. The HUL approach can help to achieve the Sustainable Development Goals (SDGs), specifically Urban SDG 11, which aims to fight against poverty and inequality through a people-centered approach [2,3]. Investigating and comprehending all aspects of the city, including not only individual historical sites but also the surrounding physical elements, cultural significance, and human resources, as well as recognizing how they are interconnected within each particular circumstance, form the foundation of the HUL [1,4]. Likewise, by emphasizing an understanding of the needs of both current and future citizens, locales can formulate specific strategies that preserve urban heritage while preparing for future growth [5]. HUL researchers and practitioners are currently developing and refining tools and processes. The HUL framework is flexible and adaptable, allowing both traditional and innovative tools to be integrated into urban management practices [2,4,6]. However, a lack of clarity regarding the conceptual and practical bases on the HUL approach has obstructed its further application, and the conception has remained unexplored in a variety of urban settings [3,7,8].

In the current period of urbanization, several cities worldwide, including some of historical significance, are facing difficulties, potentially resulting in the emergence of new urban classifications such as slums and informal settlements [9]. Slums, occasionally referred to as informal settlements [10], are areas that resemble deteriorated neighborhoods, and they are inhabited by low-income people living in inadequate housing situations [11–13]. Various factors contribute to the formation of slums, such as high rates of rural-to-urban migration, poverty, economic crises, and limited urban space [14]. Significant causes of the existence of slums include inadequate urban planning and policies, a lack of resources, governmental corruption, and social inequality, which are especially prevalent in the third world [14–17]. To tackle the problems associated with slums, global organizations (e.g., UN-Habitat) and local authorities globally employ various strategies, including eradication, forced eviction, relocation of low-income families to alternative areas, and the provision of affordable housing and services through plans such as sites-and-services schemes and on-site upgrading [18].

In many cities throughout Asia, the current strategy for addressing urban slums consists of displacement and eviction measures [19]. Governments may see the execution of relocation initiatives, which include moving residents into conventional housing, as a convenient solution. Nevertheless, these measures often fail to address the root causes of poverty and inequality, potentially prolonging patterns of marginalization and exclusion. Indeed, administrations often make decisions without conducting comprehensive studies or involving residents in the decision-making process. This can lead to conflicts between the slum dwellers and local authorities. Furthermore, several scholarly studies have contended that eviction and relocation activities are the main catalysts for the erosion of citizens' original sociocultural livelihoods and communal ties, e.g., [20–23]. In the academic realm, several scholars have conducted extensive research on slums in different settings, including slums in megacities such as Dharavi in Mumbai and Bangkok [24–27], deteriorated neighborhoods in Mauritius [28], slums situated in water bodies in Nigeria [29], and slums located along riversides in several locations in Indonesia [30–34]. These scholars have delved into investigations that combine the physical, socioeconomic, and sociocultural factors affecting the inhabitants with the environmental and political dimensions of the areas to better understand the challenges faced by residents and to propose potential solutions, contributing to the broader discourse on urban development and social justice and aiming to improve the lives of slum dwellers. While there have been a number of studies on slums, few studies have focused on the historical aspects or conducted investigations specifically inside slums that have historical significance.

This paper demonstrates the adaption of the HUL approach to investigate slum-like informal settlements in the historical city of Chiang Mai in northern Thailand. Informal communities have expanded along the city canal, surrounded by the historic components of the city. In these communities, the slums must be upgraded while simultaneously conserving the historic features. By applying the HUL concept to the study site, the study aims to understand the various components of the slums and their interplay with the historical context, clarify the settlement composition, and gain insights into the perspectives of the inhabitants. The current study intends to provide support for housing upgrades and serve as a fundamental resource for the architects, urban planners, and policymakers involved in the city's forthcoming redevelopment projects by offering realistic recommendations. The goal of the research effort is to apply the HUL approach, combined with architectural built environment methods, to further assess the historical significance of an urban slum-like informal settlement.

2. Background to the Mae Kha Canal Informal Settlements in Chiang Mai Historical City

Chiang Mai, a historical city, was founded in 1296 by King Mangrai and served as the capital city of the Lan Na Kingdom or the *Kingdom of a Million Rice Fields* (late 12th to 18th century) [35] (see Figure 1 for the location). Historically, King Mangrai relocated his capital

multiple times before founding Chiang Mai [36]. The previous capital of the city was called Wiang Kum Kam, which was located near the Ping River; however, this city did not remain the capital for long due to frequent flooding. Consequently, in 1291, the king determined an ideal location at the foothills of the mountain named Doi Suthep, where he noticed and interpreted seven auspicious signs that were considered to be good omens according to his traditional beliefs [37]. These signs represented abundant natural resources suitable for founding a city and feeding agriculture, including rare species of animals (white deer, white mice, and white albino deer); the slope down from the west to the great river basin in the east; a crystal-clear waterfall from the Doi Suthep flowing into the city's streams, the *Mae Kha Canal*; a large lotus lake; and the wide and long River Ping [38]. Based on these discoveries, the king established a new city called *Nopburi Sri NakornPing Chiang Mai* as the permanent capital.

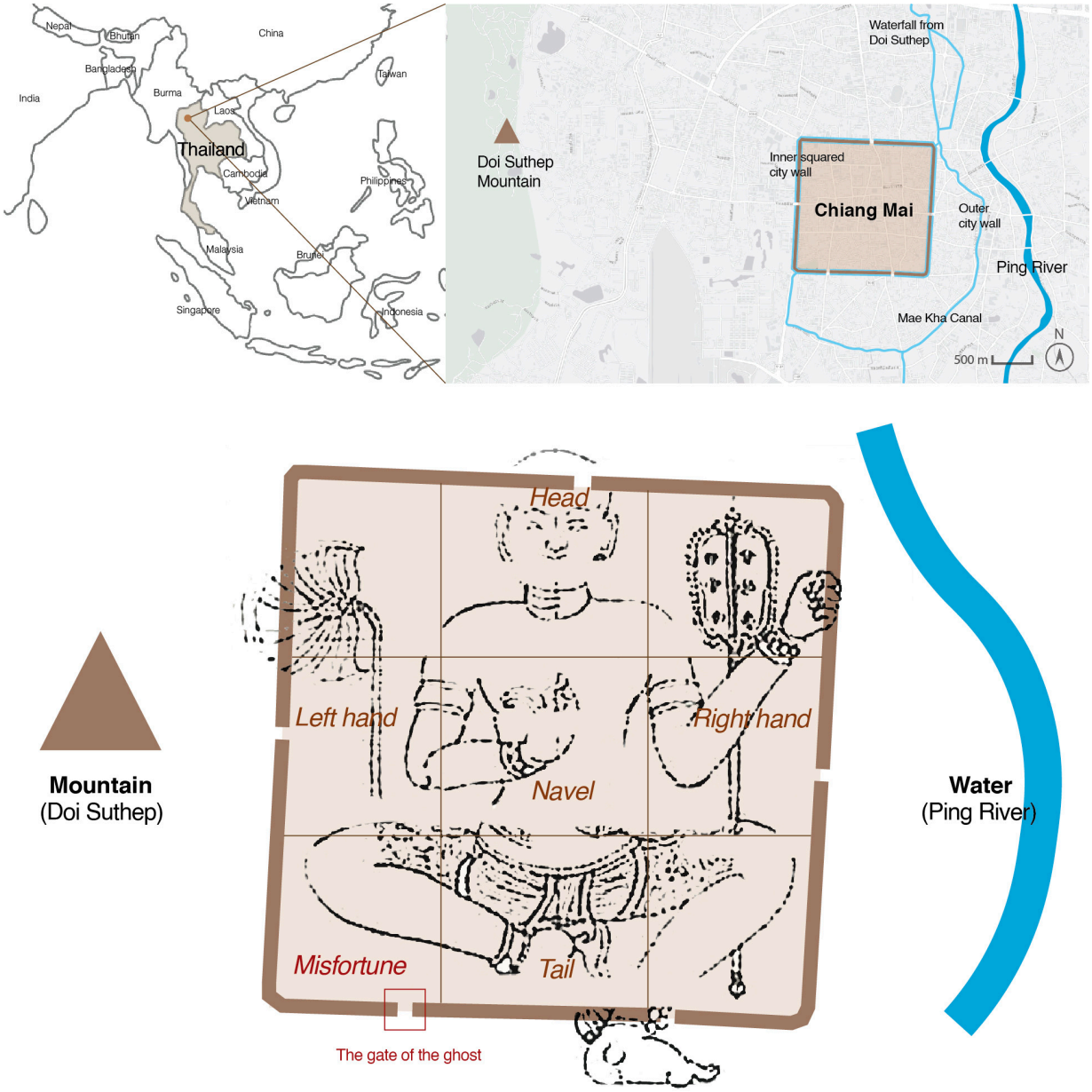


Figure 1. The location of Chiang Mai in Thailand and the mythological city planning concept of *Thaksa Mueang*, indicating a living body and human connection with nature (images by the author).

After the capital was established during the Mangrai dynasty, the virtually square-shaped ancient city wall of Chiang Mai and its outer moat and wall were built to defend the city against battles. While building the wall, a waterway was excavated to divert water from Doi Suthep to supply the city. The city's layout was centered on a rectangular city wall located between Doi Suthep and the Ping River (a mountain and water, respectively), in line with the king's Hindu–Buddhist astrological beliefs and the local traditions of Tai Yuan and Lawa [36]. The conceptual planning was created to depict a human body and soul, known as *Thaksa Mueang*, consisting of a head, midsection (navel), hands (left and right), and feet (tail) [39,40]. This symbolizes a human being living in complete harmony with nature and deeply connected to it [36]. The head pointing north reflected the city's prestigious position as the entrance to the emperor; the right-hand side facing east, connected to the river, was designated for residential and commercial purposes; the left-hand side, facing west, connected to the mountain, was set up for religious and educational purposes; and the foot facing south corresponded to a less favorable position (misfortune) and was assigned for graves, lower-to-middle-class individuals, and artisans [39,41] (Figure 1). Thereafter, Chiang Mai City developed alongside the river and canals, with the mountain and water considered to be the essence of spirituality for the people of Chiang Mai. To this day, numerous local rituals and festivals in Chiang Mai are still held in connection with the city, sacred mountain, and water.

At present, Chiang Mai is a provincial city that serves as an economic, educational, and tourist hub of northern Thailand. City development and rapid urbanization have transformed the city's land usage from that of an agricultural society to one with a focus on capitalist economic growth, leading to an increase in population and tourists [41–43]. The square-shaped city wall area stands as the city center, surrounded by marketplaces and commercial districts [44] (see Figure 2) that attract low-income migrants from marginalized areas, such as the mountainous regions, other provinces in Thailand, and neighboring countries, in search of better job opportunities. Due to the arrival of migrants, there was insufficient space for accommodation in the city; therefore, these migrants formed illegal settlements, including squatters in the south of the city center along the Mae Kha Canal [45,46]. As mentioned above, in the planning concept, the southern position was deemed unlucky because of its association with funerary rituals and being prone to floods, which meant that few people chose to live there in the past. Indeed, these southern areas were neglected by authorities throughout the squatting period [47,48]. As a result, the neighborhoods adjacent to the Mae Kha Canal and the outer city wall in the surroundings of the historical site turned into slum-like informal settlements. The *Mae Kha Canal informal settlements* are characterized by inadequate housing and public spaces, including a lack of long-lasting, suitable dwellings (Figure 2). The slums and historical components squatting along the Mae Kha Canal have been a persistent challenge for Chiang Mai City due to the involvement of numerous stakeholders, which has made problem solving complex.



Figure 2. Map of Chiang Mai City and the location and situation of the Mae Kha Canal informal settlements (images and photographs by the author).

3. Materials and Methods

3.1. Site Study Area

The study site is located in the Chiang Mai municipality of Chiang Mai, Thailand. The Mae Kha Canal informal settlements are situated along the canal to the east and south of the square-shaped Chiang Mai city center. The area comprises 11 communities. The ownership of land in the informal settlements of Mae Kha is a complex matter involving various stakeholders. Some land is owned by the Chiang Mai municipality, while other land is owned by the Treasury Department, the Fine Arts Department, and the Marine Department.

The research presented in this article was conducted within the Kampaeng Ngam community. The area is located in the Chang Klan subdistrict, which is situated in the southern part of the city center. Kampaeng Ngam currently comprises 130 residential units and is home to 434 inhabitants, the majority of whom belong to the low-income demographic. The total area of the community is 32,351 m^2. Physically, the Mae Kha Canal informal housing can be characterized as slums sandwiched between the historical city's outer wall and the Mae Kha Canal, which are part of the city's urban heritage. Figure 3 shows the location of the study area.

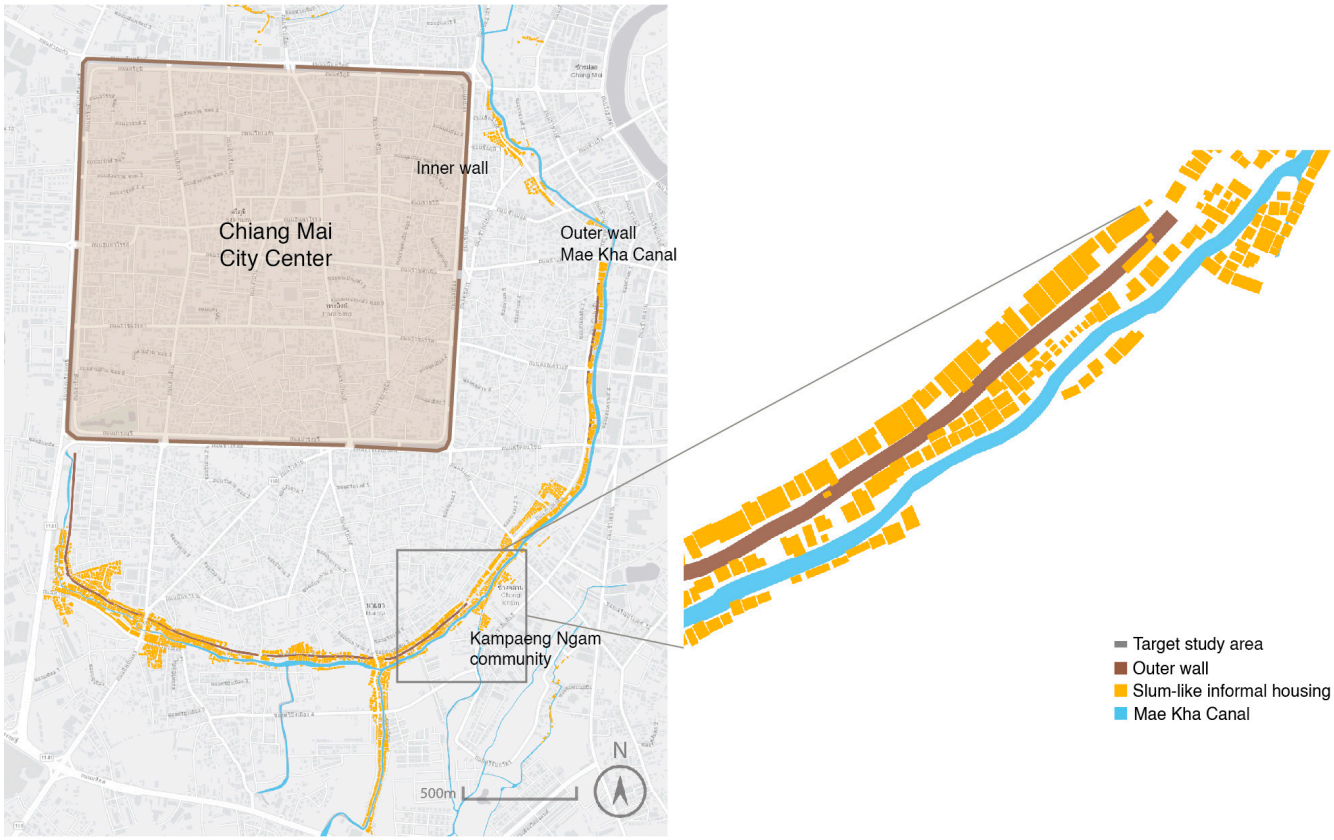


Figure 3. Location of the study area: the Kampaeng Ngam community (images provided by the author).

Regarding the historical outer wall of Chiang Mai, it stands parallel to the Mae Kha Canal. In the past, the wall was constructed using bricks and had brick coverings over the soil in several locations of the wall [49]. According to the Fine Arts Department of Chiang Mai, Thailand, there is no existing record or construction documentation on the shape of the wall. Plenty of parts of the wall have been damaged and occupied by informal dwellings along the Mae Kha Canal. Figure 4 displays photographs indicating the past and current state of the outer wall, as well as the condition of the informal dwellings along the Mae Kha Canal that are located adjacent to the wall.



Figure 4. Characteristics of the outer wall of Chiang Mai: (**a**) a photograph of the outer wall from the past, recorded by an occupant of the Mae Kha Canal community [50]; (**b**) present state of the outer wall (photograph by the author); (**c**) the situation of informal housing in the vicinity of the historical elements (photographs provided by the author).

3.2. Historic Urban Landscape (HUL) Approach and Tools

In the past, conservators focused solely on the physical aspects of urban heritage, such as important buildings and archaeological sites, with the intention of preserving them as lifeless monuments and lifeless museums [51], as in the conservation of Catholic cathedrals, historical sculptures, ancient plazas, Roman temples, and castles in first-world nations in Europe and North America. However, these methods of conservation that only focus on physical features are not suitable for developing countries such as those in Southeast Asia [52–54], Latin America, and Africa [55]. This is because they disregard traditional functions and can potentially alter the original historical, social, and community meanings [56].

Consequently, in 2011 [1], the UNESCO committee endorsed the concept of the historic urban landscape (HUL), which is an innovative approach to urban conservation that integrates various frameworks and holistically studies an area. The HUL approach considers that combined heritage preservation and development may be achieved by analyzing and comprehending the interplay of many components and layers inside a city. This allows for the recognition of complex parts of cities and the formation of unique senses of place and identity [9]. Indeed, the HUL approach emphasizes a human-centric strategy that caters to the needs of both present and future citizens in our quickly urbanizing and modernizing society. The approach strives to create a resilient, safe, livable, inclusive, and sustainable, as well as people-centered, urban environment [1,4,6].

At present, researchers and practitioners are actively developing the HUL approach and tools. To promote understanding and implementation of the HUL approach, researchers should ensure that their study designs involve key stakeholders, such as communities, decision makers, professionals, and managers. This helps in defining and refining local strategies and addressing any local challenges that may occur [7,57–59]. The UNESCO committees (2011) [1] also urge researchers to focus on the complex layers of urban settlements to attempt to identify values and comprehend the consequences for communities. Such layers encompass various aspects, such as physical existence, social dynamics, cultural influences, socio-economic conditions of residents, needs of residents, ecological factors, and political context [1]. In the early stages of researching historic areas and implementing the HUL approach, the areas should be mapped to identify the layers of natural, cultural, and human heritage and to understand the values of heritage, the dynamics of change, and the needs and demands of the area [60,61]. As a result, the process can continue to integrate frameworks, prioritize actions, and establish local responsible practitioners or partnerships in the reality of practice [62].

The HUL guidebook (2016) [2] provides a summary of the toolkits used to address the study of complex environments and the management of cultural heritage. These toolkits include (1) knowledge and planning tools, such as research on partnerships and stakeholders, which take into consideration the needs of local government, mapping, GIS, and the study of morphology; (2) community engagement tools, including cultural mapping, learning, surveying the community, residential participatory activities, community empowerment, and a step-by-step scheme for policy improvement based on local reflection; (3) regulatory tools, consisting of community planning, local laws, and regulations on heritage conservation development; and (4) financial tools, encompassing grants and seed funding. The integration of these four categories of tools can potentially facilitate effective management that combines growth with the conservation of a city's heritage [63].

3.3. Research Methodology

The paper applies the HUL approach and tools, including knowledge and planning tools and community engagement tools, to investigate an informal settlement site. First, the study involved a literature review that included slum studies, informal settlement management, and the HUL approach, as well as prior scholarly works related to the Mae Kha Canal locations. The HUL approach has been under development by several researchers and practitioners broadly, as mentioned above. Thereby, this study applies

the HUL concept to explore the issue within a specific context and obtain comprehensive knowledge of the problem in a more concrete way in order to fill in any existing gaps and further the development of the HUL method. The research uses a qualitative method, particularly emphasizing field survey investigations and analysis, to propose localized solutions for slums that are surrounded by historical elements. Field surveys in Chiang Mai were subsequently conducted from August to September 2022 and again from August to September 2023. Figure 5 illustrates the research flow.

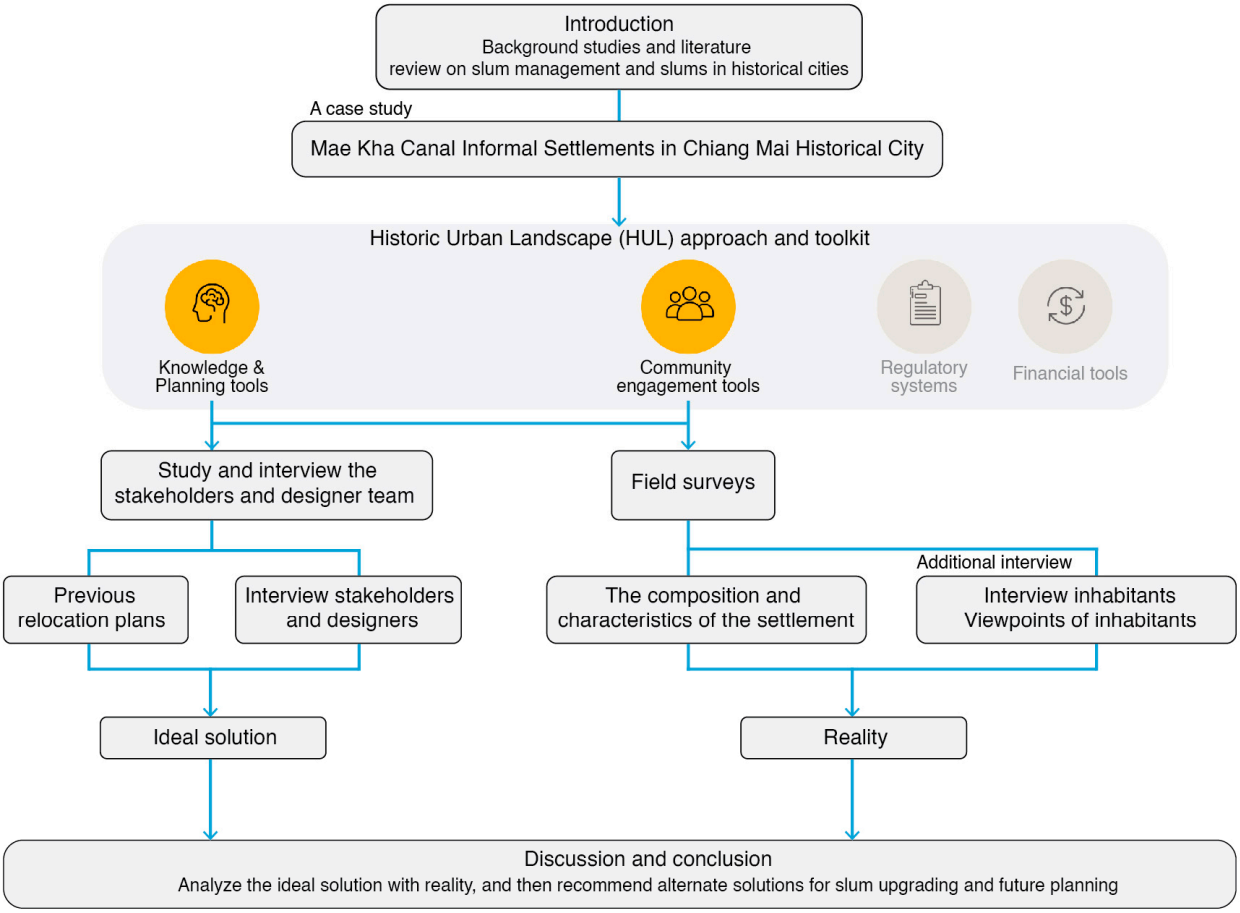


Figure 5. Research methodology and procedure (source: the author; the HUL toolkit is adapted from the official website of UNESCO's World Heritage Centre: https://whc.unesco.org/en/hul/ (accessed on 24 December 2023)).

3.3.1. Stakeholder and Designer Interviews

With regard to the implementation of the HUL approach, this paper describes research on stakeholders and their ideal strategies for managing the target site. Previous strategies for the slum problem in the area were examined. This research included interviews with and studies on various stakeholders, including the staff of the Chiang Mai municipality, the Fine Arts Department, a civic group in Chiang Mai dedicated to the Mae Kha Canal area, and the current area designer teams (i.e., the Community Organization Development Institute [CODI] and JaiBaan Studio Architects).

3.3.2. Field Survey

The field survey method was used to identify the reality of the target study area. The community's physical infrastructure, building use, public utilities, and circulation were all mapped at the outset of the investigation. The physical characteristics and settlement composition were documented through a section-by-section analysis via measuring,

drawing, and photography. In addition, in the first survey, the community leader and 16 homeowners were interviewed to collect their opinions on future slum upgrades. Based on all the data collected, the ideal solutions and the reality of the place were analyzed, and an appropriate alternative is provided in the discussion section.

4. Results

4.1. Stakeholders' and Local Authorities' Strategies: Ideal Solutions

4.1.1. Previous Relocation Plans in Brief

The situation along the Mae Kha Canal in Chiang Mai is characterized by complex ownership structures involving many government agencies and community stakeholders. In the early 2000s, the Department of Fine Arts attempted to evict squatters in order to preserve the historical wall and moat [46]. However, due to opposition from the community and with the help of non-governmental organizations (NGOs), concessions were made that allowed the inhabitants to remain, with some restrictions [45]. Nevertheless, with the influx of low-income individuals to the city and the lack of available space, squatting has steadily returned. Consequently, the local authorities decided to move the residents once again to the Chiang Mai Provincial National Housing Nong Hoi Subdistrict (NHA housing), which is located far from the city center. A subsequent proposal, the *Bann Kon Thai Pracharat* housing project, was proposed in 2018. The objective of this project was to build large apartment complexes for the city's low-income residents, constructing 1170 room units spanning 24,000 square meters and accommodating 3500 people near the foothills of Doi Suthep. Figure 6 shows the location of the preceding plan for relocation and provides details about the housing options offered for those with low incomes.

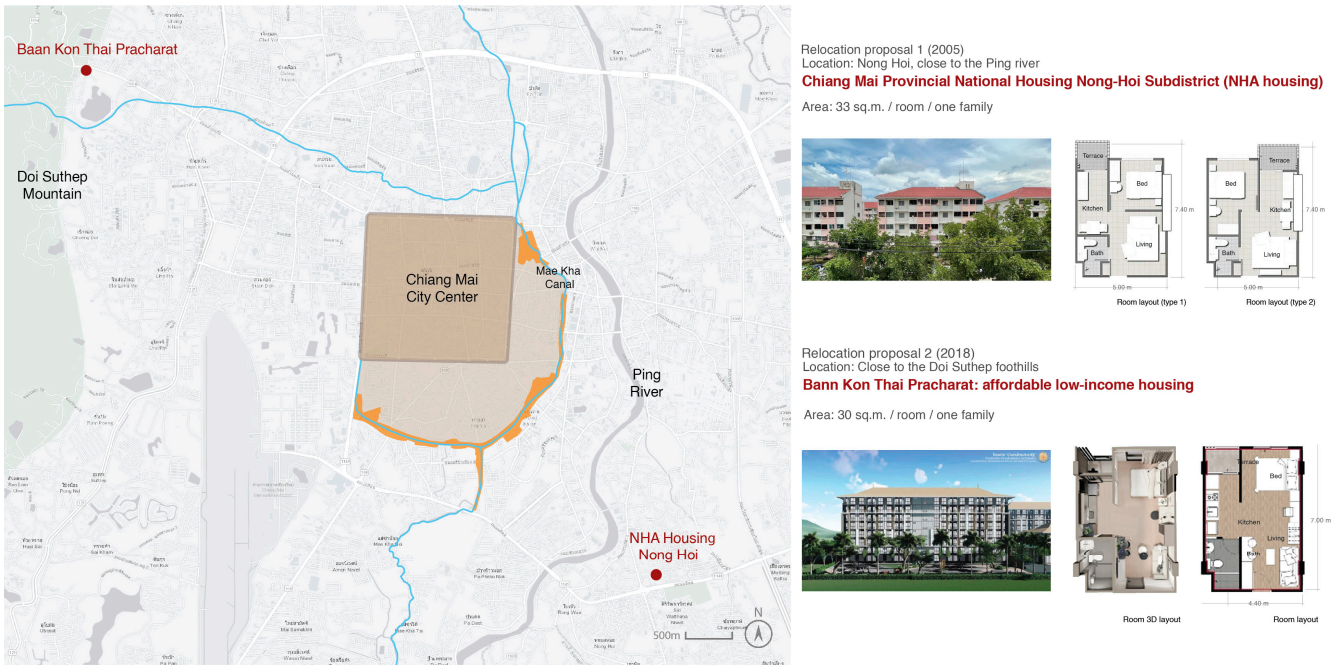


Figure 6. Previous relocation proposals: the Chiang Mai NHA housing project of 2005 and the Baan Kon Thai Pracharat strategy of 2018 (source: the author).

The relocation proposals were widely rejected due to their difficulty and distance from the city, in which much of the population works. Indeed, the relocation plans resulted in a significant conflict between the low-income residents and local officials, particularly regarding the Baan Kon Thai Pracharat project and the attempted eviction of Mae Kha Canal low-income individuals. In the case of the Pracharat housing project, citizen organizations, networks, and NGOs in Chiang Mai City are supporting those with low incomes by urging the authorities to look into environmental and community concerns. Civic groups have

strongly opposed the idea of Pracharat, citing three factors: the structure's height, the environment and ecoculture of Doi Suthep mountain, and the densely packed layout. The relocation plans were eventually shelved.

4.1.2. Current Agenda for the Mae Kha Informal Settlements (2023–2027)

The span of many years notwithstanding, the relevant authorities have made limited progress in resolving the problems related to squatting, settlements, water, and environmental issues in the Mae Kha Canal. To address the shortcomings of state policy, the local architects Kon JaiBaan (JaiBaan Studio Architects) have launched a community-based development campaign for the Mae Kha Canal: Imagine Mae Kha [64]. The campaign represents a grassroots effort to address long-standing issues surrounding the canal, supporting and engaging with the low-income communities. The initiative seeks to catalyze positive change and promote sustainable development in the area by hosting a variety of activities, such as design workshops, activities for local children, community-driven infrastructure projects (e.g., bridge construction), public meetings, and presentations to residents, as well as ensuring food security for the poor during the COVID-19 pandemic [65].

As a result of the ongoing efforts by architects and citizen-driven initiatives, local authorities are now addressing issues concerning the Mae Kha Canal. By the end of 2022, the city governance had formed committees and working groups to tackle all concerns related to the canal. The Mae Kha Canal housing upgrades and slum improvements in the pilot settlements of Kampaeng Ngam and Hua Fai are expected to be completed by 2027. Based on the interviews conducted with stakeholders and the design team, the roles, responsibilities, and ideas are gathered and presented in Table 1.

Table 1. Relevant authorities' and stakeholders' roles, responsibilities, ideas, and strategies.

Authorities	Roles and Responsibilities	Ideas/Strategies
Chiang Mai municipality	As the head of the project, it brings together all government, business, and academic organizations. It hosts meetings related to the project agenda and provides financial support from the national government.	• It enforces the set-back laws: Housing must be set back from water. • It relocates slums and squatters in certain areas to vacant land in Chiang Mai municipality. It designs NHA housing consisting of four-story apartments (one-size-fits-all dwellings). • It proposes the construction of temporary homes in vacant lots nearby throughout the process of upgrading the slums.
Fine Arts Department, Chiang Mai	It is conserving and restoring the outer fortification, which is part of the historical heritage of the city, while also enhancing the surrounding landscape.	• It prioritizes the management of slum communities. Some zones have to relocate slum houses to the open space of the outer wall. • Housing should not exceed the height of the wall. • It creates land use, zoning, and restrictions, such as prohibiting public spaces or activities on the wall. • It is designing a scene that reflects the old town and highlights the significance of the ancient walls.

Table 1. *Cont.*

Authorities	Roles and Responsibilities	Ideas/Strategies
Community Organization Development Institute (CODI)	It supports low-income neighborhoods by connecting and engaging with the inhabitants. It studies and surveys households and sites and is creating a community map using participatory GIS. It is the community representative in negotiations with government authorities.	• It uses the Baan Mankong (secure and low-cost housing) model to develop new residences without squatting in state property. • It encourages low-income individuals to save money so that they can afford the new standard housing. It has the goal of improving the quality of life of low-income people by providing secure dwellings via participatory design with people in the community
JaiBaan Studio Architects	They are designing a master plan, including the landscape and architectural style of the housing for the slum upgrades.	• They are developing an in situ slum upgrading strategy. • They seek to keep as many original homes as possible in their original locations. • They are engaging with those who live in the area in the design process. • The design planning involves positioning the dwelling units at a distance from the canal and the ancient wall and creating new pathways.
Chiang Mai citizen groups, networks, and NGOs	They are connecting and supporting low-income communities. They are encouraging beneficial changes, developing campaign issues, and promoting events in the city. In the event of disagreements and conflicts, they will band together and mobilize cooperating locals and groups or engage in protests.	• They seek to clear all squatting houses. • They aim to improve water quality while upgrading slums, and they support canal maintenance and cleanliness. • They use social media trends and promote canal tourism via boating to encourage people to protect the canal. • They cannot apply the same strategy to improve slums in all communities.
Leaders of communities along the canal	They host meetings and gather concerns from low-income villagers in communities. This enables the people to unite and debate the Mae Kha canal agenda.	• They prefer to live in the Mae Kha location. Most of the occupants have agreed to move back and lose some of their home space, but they continue to live on the original property and are willing to participate in the design process, respecting the majority of people's voices.

Currently, the agenda is getting started, with the CODI and the team of architects initiating an investigation and household survey to develop a GIS community map for the future master plan design. As seen in Table 1, the authorities involved in the Mae Kha Canal agenda have diverse strategies and concepts. Therefore, stakeholders must engage in negotiations and condense the ideas into a more appropriate and cohesive strategy.

In particular, because of the complexity of stakeholders and property owners, they must collaborate and integrate their operations in a holistic way. Based primarily on the ideas of the JaiBaan studio architects and others regarding the agenda, we analyze the optimal design solution more concretely, taking into account slum upgrading in the historical parts of the city. Figure 7 illustrates the ideal solution.

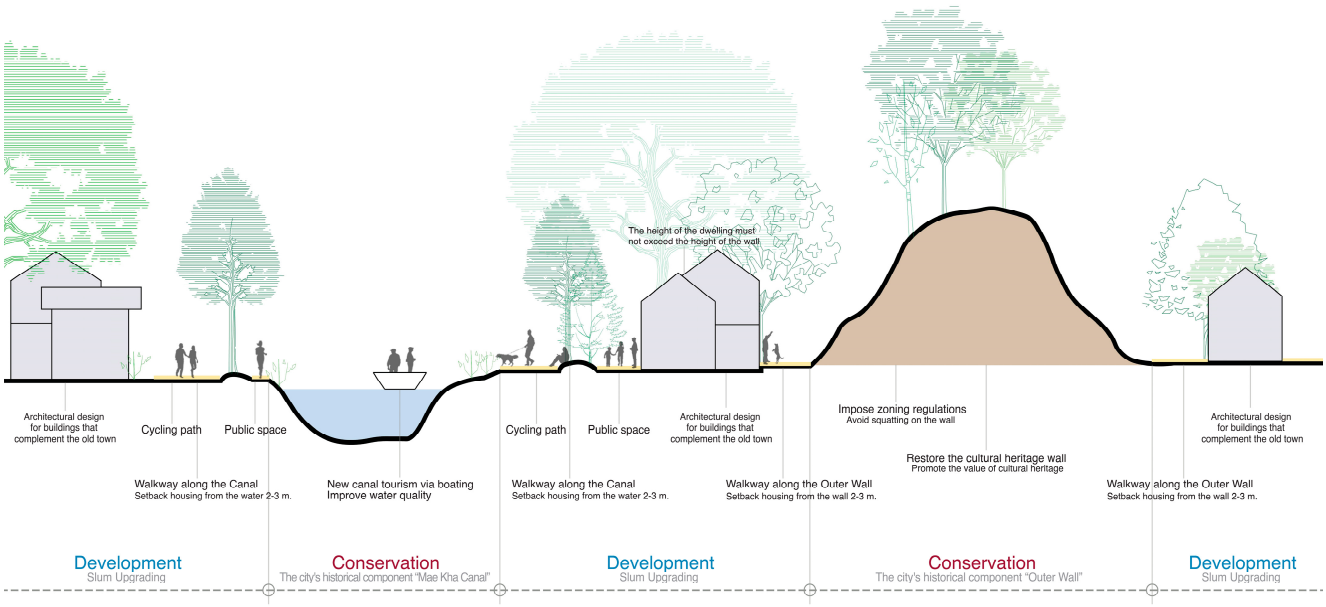


Figure 7. A section of the ideal plan (based on the interviews) for both upgrading the slums and conserving the historical features (including the canal and historical wall) in the Mae Kha Canal informal settlements (image provided by the author).

Based on Figure 7, this solution has been solely motivated by the local authorities' desire and has not yet formed a more unified direction. Communities in developing countries often have limited communication with government officials about community development, which necessitates third parties, such as NGOs, architects, and urban planners, as well as researchers, to facilitate interactions or advocate on their behalf to the local government. Therefore, the investigation in the subsequent section serves to facilitate the interaction between the third sector and local authorities by examining the current state of the area and highlighting the viewpoints of those who live there, thereby ensuring that local authorities can obtain a better understanding of the site and the residents' realities.

4.2. Settlement Characteristics: Reality

The field study begins by investigating the use of buildings, facilities, and circulation within the community. Figure 8 depicts a map of Kampaeng Ngam based on the surveys. According to Figure 8, almost all the buildings were built for residential use (over 80%). Aside from housing, there are some mixed-use, commercial, retail, apartment, and rental buildings, as well as some public-use structures (e.g., a community center and public storage). There is a garbage pickup station and a fire protection spot for community use. The current physical community surroundings along the Mae Kha Canal were improved by the city's architects' 2022 collaboration with the Chiang Mai municipality. For example, there are pathways along two sides of the canal, each with a width of two meters and a length of 750 m. In addition, there are two bridges within the community that locals can utilize to traverse the canal and reach the other side. However, there is still a deficiency in terms of the circulation inside the neighborhood, as cars, motorcycles, and walkers are unable to access all areas of the community.



Figure 8. Community map of Kampaeng Ngam, illustrating the existing building use, utility, and circulation of the investigated sections (S1–10) of the settlement characteristics (image by the author).

Regarding the settlement characteristics, we analyze them by conducting a survey analysis on a section-by-section basis. The map in Figure 8 shows the 10 section lines. The sections demonstrate the settlement's composition, which primarily consists of informal houses, the canal, and the historical wall (Table 2).

Table 2. Sections (S1–S10) and photographs showing the characteristics of the informal settlement.

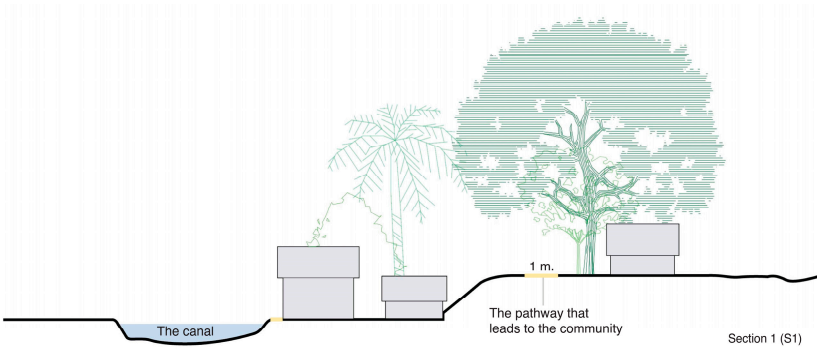
Situations and Characteristics of the Informal Settlement Surrounded by Historical Elements		
	Settlement Composition	**Photographs**
S1		

Table 2. *Cont.*

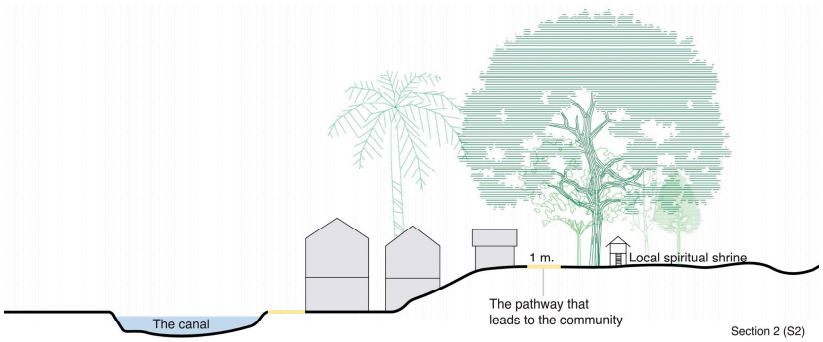
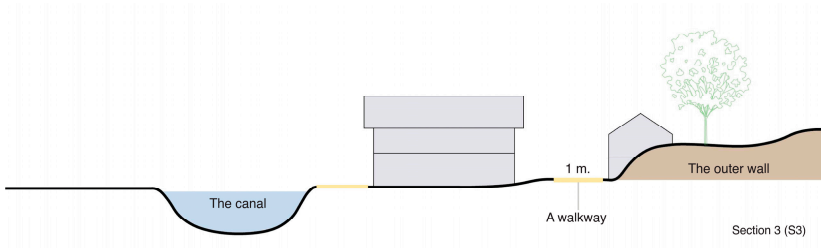
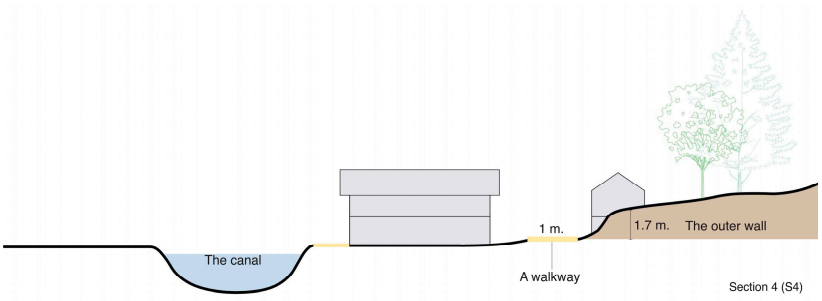
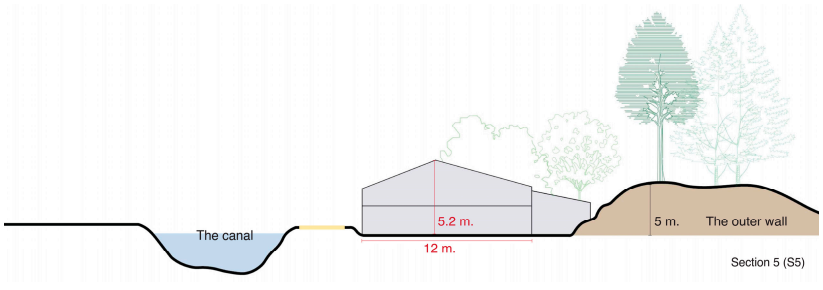
Situations and Characteristics of the Informal Settlement Surrounded by Historical Elements		
	Settlement Composition	**Photographs**
S2		
S3		
S4		
S5		

Table 2. *Cont.*

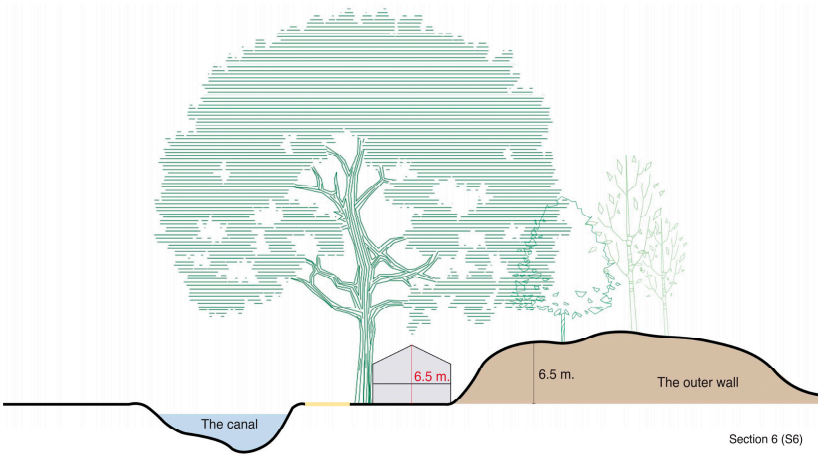
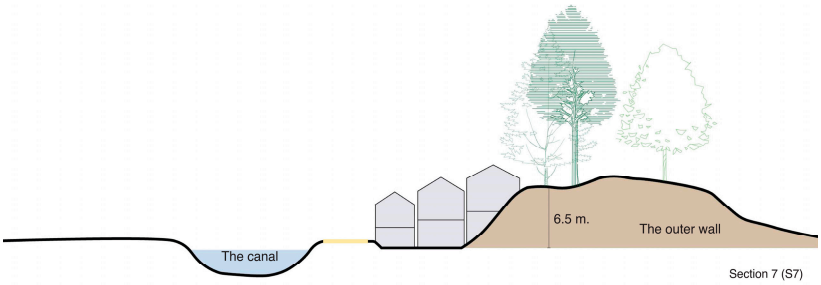
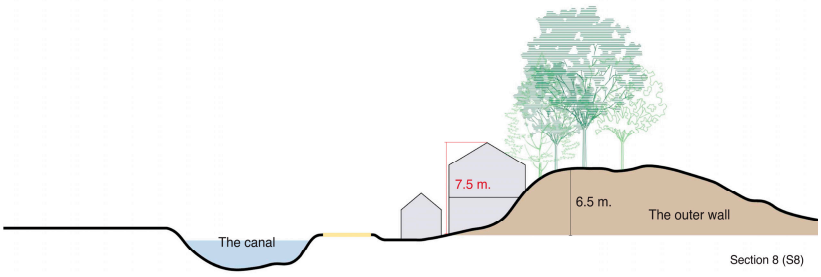
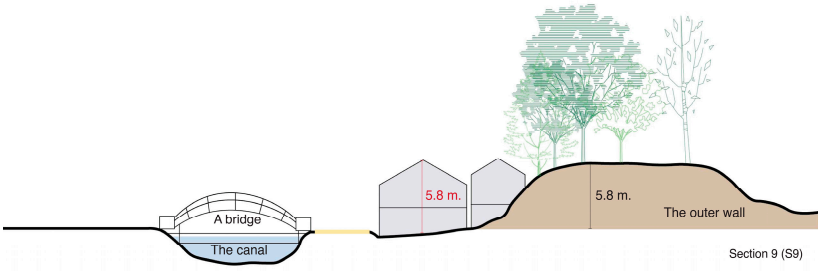
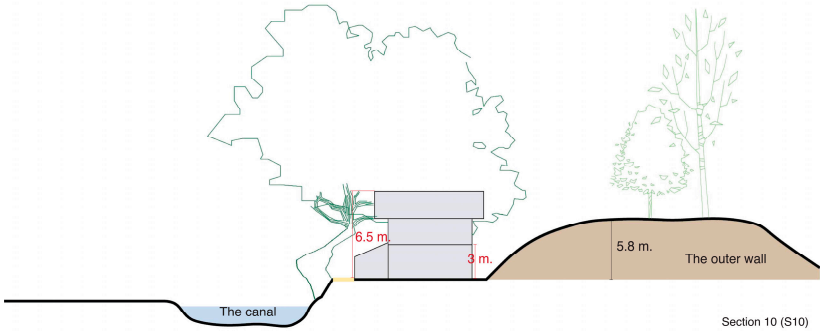
Situations and Characteristics of the Informal Settlement Surrounded by Historical Elements		
	Settlement Composition	**Photographs**
S6		
S7		
S8		
S9		

Table 2. *Cont.*

Situations and Characteristics of the Informal Settlement Surrounded by Historical Elements		
	Settlement Composition	**Photographs**
S10		

Nearly all the houses shown in Table 2 are two-story buildings. Based on the field survey, the informal dwellings are situated in the area between the Mae Kha Canal and the historical outer wall. Overall, most of the houses adjacent to the wall are situated on the wall, appearing to be squatting on the wall. The majority of these dwellings have a similar or greater height compared to the height of the wall. However, the houses located near the canal have already been moved further away from the canal due to the landscape enhancement of 2022. Based on the data shown in Table 2, we conducted an analysis and divided the settlement characteristics into six different types: Types A, B, C, D, E, and F.

- Type A, including S1 and S2: This location is the starting point of the historical wall. There is a communal spiritual shrine, located at the beginning of the wall, that is held in high regard by those who live nearby (see Section 2). The informal dwelling is divided into two sides by the road that enters into the neighborhood. In addition, a huge tree dominates the composition.
- Type B, including S3 and S4: The informal dwelling is divided by the road, matching Type A. However, the houses positioned adjacent to the wall are built on the wall. The historical wall is used for dwelling functions, such as motorbike parking, hanging clothing to dry, storage, and basement construction. Due to the fact that the houses stand on the wall, the heights of the houses are much greater than the height of the wall.
- Type C, including S5: This location marks the endpoint of the road that separates the two sides of the informal dwelling area. There is a large home that is taller than the historical wall. Part of the house's space is constructed on the wall.
- Type D, including S6: There is a single informal structure situated between the wall and the canal. The home is constructed in very close proximity to the base of the wall. The height of the house is approximately the same as the height of the wall. In addition, a huge tree dominates the composition.
- Type E, including S7, S8, and S9: There is a group of informal buildings situated between the wall and the canal. The residences that are closest to the wall are built on the wall. Most of the structures are higher than the wall, and only a few buildings have a height that is lower than the wall. There is a bridge that spans across the canal to the opposite bank.
- Type F, including S10: There is a single informal structure situated between the wall and the canal, with an adequate distance from both the wall and the canal. However, the height of the structure significantly exceeds that of the wall. In addition, a huge tree directly next to the canal dominates the composition.

4.3. Viewpoints of the Inhabitants

In addition to interviewing relevant authorities to gather information about their ideal plans and conduct site studies, we also interviewed local inhabitants to understand their actual needs and opinions regarding the upgrading of the slum. A total of 16 householders were interviewed, with 15 of them sharing their opinions.

In general, the interviewees were adults or elderly individuals. A majority of the interviewees had nuclear families consisting of 1–4 members, while a smaller proportion had medium-sized families with 5–7 members, and a few had large families with more than 7 members. They mainly resided along the Mae Kha Canal due to its proximity to their workplaces and family, the low cost of living, and expulsion from other areas. More than 90% of interviewees lacked formal education beyond junior high school. Only a small number of members had finished high school or college. Most residents in Kampaeng Ngam are classified as low-income according to the national income standard, with average monthly earnings amounting to roughly THB 10,000. Additionally, most of the respondents we interviewed had relatives and families residing in the neighborhood. They lived adjacent to or in close proximity to their relatives' residences. Table 3 shows the profiles of the inhabitants we interviewed.

Table 3. Inhabitant profiles (the total number of interviewees was 16).

Profiles		Responses (N)	Percentage (%)
Age (years old)	21–40	6	37.50
	41–60	3	18.75
	More than 60	7	43.75
Family size (members)	1–4	10	62.50
	5–7	4	25.00
	More than 7	2	12.50
Reason to stay	Workplaces	7	43.75
	Family reason	6	37.50
	Cheap living costs	1	6.25
	Not specified	2	12.50
Education level	No education	4	25.00
	Junior high school	10	62.50
	High school	1	6.25
	University	1	6.25
Household's income per month (THB) *	Up to 3000	1	6.25
	3001–5000	2	12.50
	5001–10,000	4	25.00
	10,001–20,000	7	43.75
	20,001–30,000	1	6.25
	More than 30,000	1	6.25
Relative in community	Have	12	75.00
	None	4	25.00

* THB stands for the Thai Baht, Thailand's official currency. 1 THB = 0.027 USD (16 June 2024). The term "low-income people" in Thailand refers to individuals whose annual income is less than THB 100,000.

During the interviews, every interviewee expressed concern regarding relocation or eviction efforts. Many residents choose to live here mostly due to its proximity to their workplace in the city center. Therefore, they are reluctant to move to a distant location, as it would result in higher transportation costs for commuting to work. However, almost all of them welcome the upcoming slum-upgrading project and desire to participate in decision making. They hope that the neighborhood's quality will improve and that housing is able to be built. Many homeowners are ready to grant permission for their properties to be rebuilt further away from the canal and the wall, and are willing to lose some space as long as they can remain living in this area. Nevertheless, one of the 15 interviewees

expressed their disagreement with the future improvement project. Thoughts from the 15 interviewees are shown in Table 4.

Table 4. Opinions of the inhabitants obtained during the interviews.

Interviewee	Agree/Disagree	Opinions
1	Agree	We would like to reside in the original zone, but this area could be developed.
2	Agree	I want the area to be more well organized, cleaner, and a better place to live.
3	Agree	If this can be done, it will be good for housing development. People who are already living here should continue to stay here; I don't want anyone to leave. Please help come up with solutions to problems like floods and inequality.
4	Agree	We want to participate in the process of designing and making decisions.
5	Agree	I want the landscape to be improved.
6	Agree	I want to live in here, but I may lose some of my home's area.
7	Agree	Agree, but I want to live in the original plot of land.
8	Agree	I really hope that the housing is better. I hope that people can live with the canal. I hope the water quality gets better.
9	Disagree	I want to live here on this piece of land the same way it is now.
10	Agree	I would like for the community to have more parking spots and a better land use plan.
11	Agree	I wish that the area gets better and the flooding problem is solved. I wish the scenery would get better, there would be better looking flowers, and people could live along the canal.
12	Agree	Agree, but I want to continue living in this community with my family.
13	Agree	Agree, but please respect the low-income people's voices. We would like to continue living here.
14	Agree	I am hoping for better housing. My house needs renovations, but I am short of funds.
15	Agree	I want everyone to live in their area, so no one invades others. Each home should have a separate border. Keeping residents all together is terrible because it lacks privacy and excessive sounds prevent sleep. Also, I agree with the plan to enhance the slums in the future, but I'd like to live on the original piece of land.

5. Discussion

By applying knowledge and planning tools from the HUL approach, this study was able to obtain a comprehensive grasp of the perspectives held by the local authorities who are working to address the issue of slums located along the canal in the city. Initially, the local authorities undertook a relocation strategy to transfer the inhabitants to one-size-fits-all housing units. However, it is clear that this approach disregards the perspectives of the people and ignores their genuine needs. Consequently, third-sector organizations, such as local architects, civic organizations, NGOs, and academics, are providing support for low-

income residents to encourage justice. This move has led the local authorities to reconsider their strategy for addressing the slums once again. At the moment, the local authorities are extending invitations to all stakeholders of the Mae Kha Canal location and to third-sector organizations to participate in the agenda, thereby strengthening inclusivity. Regarding the ideal planning (as shown in Figure 7), this mostly relies on the design expertise of local architects. This kind of strategy is proving to be helpful for preserving the historical wall and canal, as well as for upgrading the slum conditions on-site.

In addition, by applying HUL knowledge and planning, as well as community engagement tools, our research was able to gain a deeper understanding of the location's reality via on-site field surveys. Considering the data obtained from the surveys, it seems challenging to apply the ideal design throughout all locations inside the community. As seen in the community map (Figure 8) and the investigation of many sections (S3, S4, S5, S6, S7, S8, and S9), it is evident that informal housing has been constructed directly on or in very close proximity to the wall. When it comes to real-world execution, the local authorities must identify vacant spaces in close contact with the people living there in order to carry out the demolition of informal dwellings. In the ideal scenario, the agenda is to remove the informal settlements from the old wall by a distance of two to three meters. Nonetheless, in practice, it is crucial for local authorities to engage in discussions and invite the residents to participate in determining [66,67] the specific distance of the shift. Likewise, the interview results clearly show that nearly all homeowners are in favor of the developments and are willing to actively participate in the negotiation and decision-making process.

In the past few years, there has been growth in the research and analysis on slums in the developing world, particularly in comparable settings. Local scholars have employed various research methods, including surveys, community and housing investigations, and interviews with inhabitants. Through these methods, they have been able to propose alternative solutions and recommendations to local governments in specific areas. For example, there have been investigations of deteriorated settlements along riversides in different cities of Indonesia [32,33,68]. However, in the case of the informal settlements along the Mae Kha Canal, there is a historical wall that has historical importance and should be given more attention when managing the issues of informal housing and waterside development. This creates an additional complicated dimension for the research. However, applying the HUL approach allows us to take into account the historical value of informal settlements and enables a comprehensive understanding of the various layers within these settlements [69]. In line with the HUL concept, communities can maintain their historic features, such as the wall and canal, while simultaneously enhancing the slums on-site. To preserve the wall, the heritage site should have a boundary line that prohibits informal housing on the wall, which archaeologists can then repair and maintain [70,71]. With regard to informal housing, safety and resilience are the primary goals [33,72,73]. Consequently, the informal housing located on the wall should be relocated in order to ensure the safety of the dwellers by protecting them from the potential collapse of the wall and from weakly constructed housing. The recommendations in Table 5 integrate the concepts of preserving historical materials and managing informal housing to recommend alternative solutions for the target site based on a thorough investigation of each section. In conjunction with the suggestions made through the planning process outlined in Figure 9, the illustration shows boundary lines that prevent the construction of informal housing on the wall and require informal structures to be set back from the canal. The figure also illustrates how the upgrading process may impact the current housing, requiring either relocation or the reduction in certain areas within the houses.

Table 5. Recommendations for managing informal housing and preserving historical walls based on a thorough investigation of each section.

Type	Section	Suggestions
Type A	S1, S2	At the beginning of the historical wall, there should be no informal structures on the right side of the pathway, with the exception of the local spiritual shrine (see S2) and the big tree. The shrine must remain, as it holds significant cultural and spiritual importance to the community, serving as a symbol of their identity and providing a sense of place and belonging [74,75]. However, the informal buildings on the left side of the road may continue to exist, and negotiations can be held with the residents regarding the height of the houses.
Type B	S3, S4	The squatter housing on the wall must be eradicated and relocated to vacant or alternative spaces within the community. However, the informal buildings on the left side of the road may continue to exist, and negotiations can be held with the residents regarding the height of the houses.
Type C	S5	The area with the informal house should be reduced by removing the part of the structure that is built on the wall. In addition, the house should be set back from the wall at an appropriate distance and with a reduced height, following negotiations with the occupants.
Type D	S6	The informal housing should be located at a distance from the wall, and its overall area should be reduced slightly.
Type E	S7, S8, S9	All structures that have been constructed on the wall must be removed and relocated to available or alternative areas within the community. In addition, the remaining group of buildings which are not built on the wall should be set back from the wall at an appropriate distance and with reduced height following negotiations with the occupants.
Type F	S10	The height of informal housing buildings should be reduced to a level lower than the height of the wall following negotiations with the occupants.

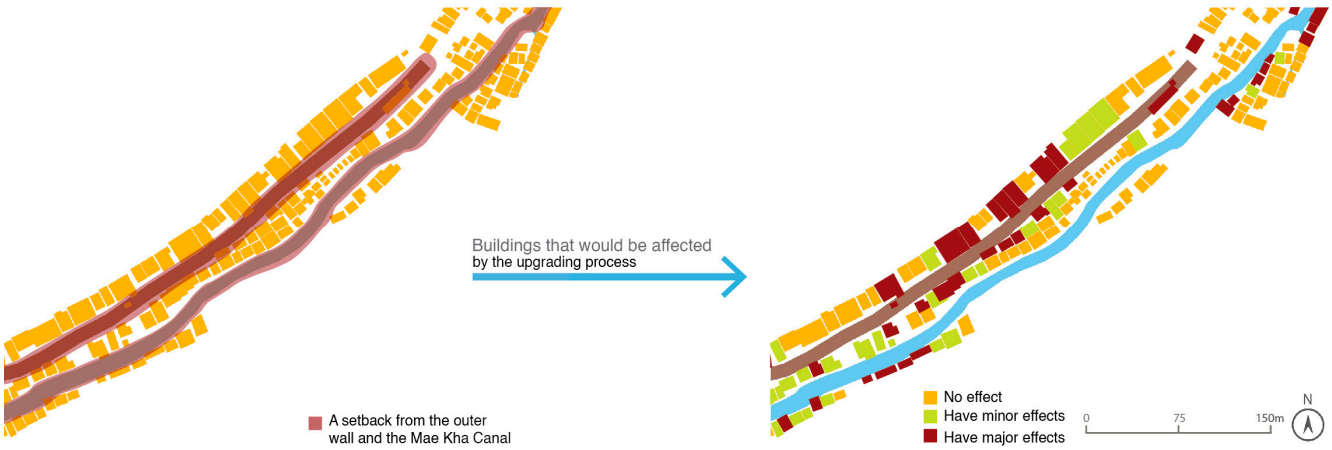


Figure 9. The location of the buildings that will be affected by the upgrading action in the Kampaeng Ngam neighborhood (images provided by the author).

Despite the benefits of implementing the HUL concept, the current study encountered some limitations during the investigations. First, the sections we examined did not include

the buildings located on the opposite side of the canal because they belong to different communities and are challenging to access. Second, the sample size for interviews is limited due to time constraints. Further research should extend the methodology to include more communities along the Mae Kha Canal, as well as a larger sample size for interviews.

6. Conclusions

The objective of this study is to apply the HUL approach combined with architectural built environment methods to better assess the historical significance of an urban slum-like informal settlement. By integrating knowledge and a planning tool, as well as connecting with the community, this research is able to gain a comprehensive understanding of the relevant authorities involved in addressing the issue of slums and squatting in the city. Additionally, it captures the perspectives of those living in these areas and assesses their current physical conditions. The findings indicate that there remains a disconnect between the aspirations of the current agenda and the actual conditions at the site for dealing with slums. Accordingly, the study suggests a basic strategy to handle the informal housing in order to facilitate future upgrades to the area while simultaneously protecting the historical heritage of the old wall. However, in practice, in order to change or relocate these informal housing units, a more comprehensive understanding and further in-depth analysis will be required in order to determine which houses can be relocated and which houses cannot be moved. Likewise, it is crucial to engage in negotiations with the present inhabitants.

The case study of the Mae Kha Canal informal settlements in the old city of Chiang Mai represents the needs and location choices of present-day citizens of Chiang Mai City, reflecting the city's limited space. This sort of phenomenon is occurring globally, particularly in developing countries experiencing rapid urbanization. Consequently, cities, including historical ones, have to enhance their ability to respond to the needs of present and future populations. By using the HUL concept in slum neighborhoods, our study is able to better grasp the complexity of the specific circumstances of the city. The HUL approach and tools can be applied to other deteriorated settlements that may be surrounded by or adjacent to historical features or other contexts, thus strengthening the development of the HUL theory. It is recommended that the HUL approach and tools be broadened to investigate various types of environments that demand resilience, despite the complexity of the location's challenges and layers. By conducting a comprehensive analysis and gaining a deep understanding of all components within those areas, it could be possible to propose more inclusive and sustainable solutions tailored to the specific challenges of that particular context. Based on this case study, researchers and practitioners can begin using knowledge and planning tools, as well as community engagement tools, to assess and understand every aspect and layer associated with a location. Afterwards, for practical implementation, regulatory systems and financial tools may be established, involving the participation of homeowners in negotiations and decision-making processes regarding community upgrading and planning. Figure 10 presents the application of HUL approaches and tools in the current initial stage of this investigation. It further outlines the recommended future practices for the Mae Kha Canal informal settlements and can potentially be adapted to other locations.



Figure 10. The current study's scheme and the subsequent practices as a result of adapting the HUL approach and tools to upgrade slums while preserving historical elements (images provided by the author).

Author Contributions: P.D. designed the study, conducted the field surveys and analysis, provided resources, interpreted the conclusion, and writing—original draft preparation; N.M. conceived the study, discussed the analysis, participated in revising the manuscript and provided funding acquisition. All persons designated as authors qualified for authorship, they participated sufficiently in the work to take public responsibility for portions of the content. P.D., as corresponding author, takes responsibility for the integrity of the work from inception to published article. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: The materials and datasets analyzed during the current study are not publicly available due to containing information that could compromise research participants' privacy, but are available from the corresponding author upon reasonable request.

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